Staff's Initial Responses to Board and Stakeholder Questions and Comments at the April 2008 Hearing

Outline of Questions & Comments

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A. "Key Policy Questions" that Staff Asked the Board

Based on written stakeholder comments submitted after the release of the February 2008 Delta Basin Plan amendment and TMDL draft staff reports, staff developed five key policy questions for the Board to consider at the April 2008 hearing. The questions highlight stakeholder concerns about the proposed mercury control program for the Delta that have not been resolved. The questions and staff's recommendations were presented to the Board during the April 2008 hearing. The Board asked staff to provide written responses to the questions for the Board's consideration before the next Board discussion. The following are staff's responses to the questions and some preliminary responses to stakeholders' comments made during the hearing.

(*Note: Board member and stakeholder questions and comments are in **bold** text; Staff responses are in plain text)*

1. Should the Delta control program focus only on making legacy mercury reductions and not require control actions for methylmercury sources?

Staff does not recommend a strategy that focuses only on reducing mercury from legacy sources. The goal of a program that controls only inorganic mercury would be to reduce the concentration of mercury in Delta sediments to levels that would reduce methylmercury in water and, ultimately, achieve the fish tissue objective. Such a program would need to focus control efforts on reducing legacy mercury in the streambeds and banks downstream of major dams to measurably reduce Delta fish methylmercury levels. As discussed in the following pages, focusing only on legacy mercury is not expected to fully address the Delta impairment.

Therefore, staff has recommended a strategy that would control modern methylmercury sources as well as legacy mercury sources because staff analyses indicate that:

- A control program that focuses only on legacy mercury would not reduce fish tissue methylmercury levels as quickly as implementing a program that addresses both legacy mercury sources and methylmercury sources;
- A legacy mercury control program likely would not achieve the proposed fish tissue objective in all areas of the Delta;
- Given that legacy mercury may comprise only about 30% of mercury entering the Delta, even if legacy mercury loads could be reduced to zero, we would still need to be concerned about activities in and around the Delta that contribute methylmercury; and

- There is adequate science and understanding of methylmercury cycling to have a TMDL based on methylmercury and an implementation program based on controlling both methylmercury and total mercury sources.

On average, approximately 400 kg of mercury enters the Delta each year. Of that, about 395 kg/yr (>98%) comes from the tributaries. Sources in the tributary watersheds include historic mining activities, naturally mercury-enriched soils, wastewater treatment plants, atmospheric deposition, urban runoff, and geothermal springs. Using data published before the April 2008 hearing, staff estimated that about 5% of overall tributary mercury loading to the Delta results from modern point sources (e.g., NPDES urban and facility discharges) and about 65% results from naturally mercury-enriched soils, atmospheric deposition, and geothermal springs. The remaining 30% likely comes from historic mining activities. Staff is currently re-evaluating these estimates based on CalFed data published in October 2008 and will make the evaluation available for public review during the hearing process.

Millions of kilograms of mercury entered Central Valley waterways from mercury and gold mining operations in the Coast Range and Sierra Nevada mountains in the 1800's and early 1900's. There are more than 8,000 gold and mercury mine sites in the tributary watersheds, and, as illustrated in Figure 1, about 80% of them are upstream of dams. Historic mining took place before the major dams were built, so that much of the mercury from the mines came into the rivers prior to the dam construction. The major dams are very efficient at trapping sediment-bound mercury that is currently discharging from the historic mines. Most of the mercury-contaminated sediment that comes into the Delta now is likely from legacy mercury in stream channels downstream of reservoirs. In addition, although testimony by the Sierra Fund indicated that small reservoirs such as Lake Wildwood may transport methylmercury downstream, recent CalFed mercury study results suggest that the three largest reservoirs – Shasta, Oroville, and Folsom/Nimbus – export very low concentrations of methylmercury. While these inorganic mercury and methylmercury loading patterns will be studied more thoroughly when the upstream TMDLs are developed, it is very likely that a control program that would require only inorganic mercury source controls would need to focus on reducing legacy mercury in the streambeds and banks downstream of major dams to measurably reduce Delta fish methylmercury levels.

The following sections provide a more detailed rationale for why staff is recommending that the Delta TMDL control program should focus on both legacy mercury sources and current methylmercury sources. Attachment 1 provides a brief review of the draft Basin Plan amendment that staff proposed at the April 2008 hearing.

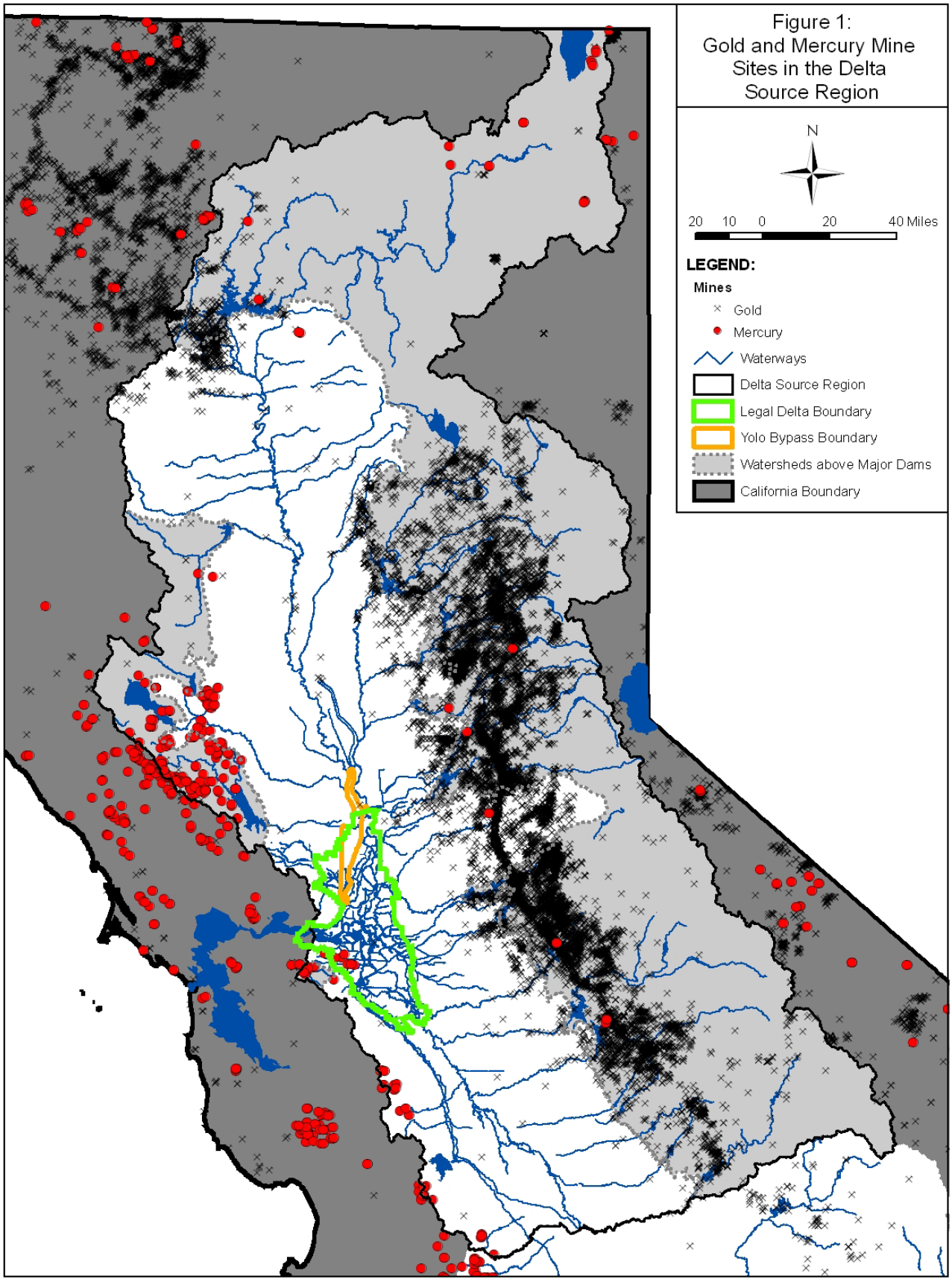
Figure 1:
Gold and Mercury Mine Sites in the Delta Source Region
N
20 10 0 20 40 Miles
LEGEND:
Mines
Gold
Mercury
Waterways
Delta Source Region
Legal Delta Boundary
Yolo Bypass Boundary
Watersheds above Major Dams
California Boundary

a. Timing of Measurable Fish Methylmercury Reductions if Implement Both Methylmercury and Inorganic Mercury Source Controls

Of the approximately 400 kg total mercury that enters the Delta each year, about 2.2 kg is methylmercury. Although methylmercury is less than 1% of all mercury discharged to the Delta, methylmercury is the form that accumulates in the food web. The best available science indicates that reducing methylmercury in ambient water is the most direct way to reduce methylmercury in biota. Methylmercury is produced by many modern-day activities that humans may be able to modify so that less methylmercury is discharged. Staff recommends that the Delta control program focus on reducing methylmercury sources by reducing the inorganic mercury that supplies the methylation sites (i.e., reduce the inorganic mercury levels in Delta sediments) and by managing the methylation sources themselves to reduce methylmercury discharges.

Implementing controls on methylmercury sources and activities that produce methylmercury has the potential to reduce methylmercury concentrations in water and fish in a much shorter timeframe than focusing on legacy sources alone. Improving the trapping efficiency of the Cache Creek Settling Basin, the single largest contributor of mercury-contaminated sediment to the Delta, has been identified as a project that would result in substantial improvements to the Yolo Bypass. However, other similarly substantial legacy mercury reduction projects have not been identified in the tributary watersheds to other areas of the Delta. While staff's proposed program includes an element to keep investigating feasible legacy mercury reduction projects, it is likely that many legacy sources will be difficult or impossible to control. In addition, natural flushing of mercury-contaminated sediments from the tributary watersheds could potentially take centuries. (See #22 on page 44 for additional discussion about the time needed for natural processes to flush in-channel sediments.)

An implementation program that controls both methylmercury and inorganic mercury uses more methods to reduce methylmercury in Delta water. Focusing only on legacy mercury reduces the number of "tools" in the control program "tool box".

At the April 2008 hearing, staff said that the methylmercury allocations for within-Delta sources were expected to address about 30% of the reductions needed to remove the fish mercury impairment in the Delta. New methylmercury loading data released by the CalFed mercury program in October 2008 indicate that annually, the proportion of Delta methylmercury coming from tributaries is greater than originally reported. Staff is currently evaluating the new methylmercury load calculations and possible implications for the TMDL.

Staff's very preliminary estimates based on the recent CalFed mercury study results indicate that the sum of inputs from wetlands, agriculture, wastewater and urban runoff

in the Delta and its tributary watersheds (downstream of major dams) could account for about 40 to 60% of all methylmercury inputs to the different Delta areas; atmospheric deposition, open space (e.g., forests and rangeland) and open water areas could account for the rest. Hence, implementation of methylmercury management activities for wetlands, agriculture, wastewater and urban runoff in the Delta and its watersheds, including improvements to the Cache Creek Settling Basin to reduce inorganic mercury discharges, has the potential to address about 30% or more of the reductions needed to remove the fish mercury impairment in the Delta.

Based on experience with past pollutant reduction efforts, staff expects that, once the Phase 1 studies are completed, it will take about 10 to 15 years to obtain funding and implement control actions for methylmercury, and another 5 to 10 years (two to three fish life cycles) for decreases in fish methylmercury concentrations to be observed. Implementing methylmercury management practices in the Delta and upstream watersheds, along with improvements to the Cache Creek Settling Basin, would likely address at least 30% of the reductions needed to address the fish methylmercury impairment in the Delta. This would result in a measurable reduction in Delta fish mercury levels. Additional reductions are anticipated as a result of implementing legacy mercury control projects in the upstream watersheds. However, the relatively rapid decreases in fish mercury levels resulting from methyl and inorganic mercury control activities would be followed by a long, gradual decline because natural erosion (a slow process) may be needed to wash out remaining legacy mercury in the Delta's tributary channels. The State Water Board and USEPA approved a similar implementation timeframe for the San Francisco Bay mercury control program: achieve about a 30% reduction within the next 40 years, and reach the fish tissue objective in about 120 years as mercury-laden sediments in Suisun Bay and San Pablo Bay erode.

b. The Need to Ultimately to Achieve Fish Tissue Objectives in All Areas of the Delta

An implementation program that controls both methylmercury and inorganic mercury is more likely to achieve the recommended fish tissue objectives in all areas of the Delta. The Clean Water Act requires the TMDL control program to ensure all areas of the Delta ultimately achieve fish tissue objectives. Reducing only legacy mercury would protect wildlife and allow humans to eat one meal a week in some areas of the Delta, but would be less protective in others. Using data published before the April hearing, staff estimated that a program that focuses only on reducing legacy mercury could achieve a consumption rate of only about two meals per month in the San Joaquin and Marsh Creek areas and less than one meal per month in the Yolo Bypass area, and that wildlife species like western grebe, mink and kingfisher in these areas would not be fully protected. Staff is currently re-evaluating these estimates based on CalFed data published since the April hearing and will make the evaluation available for stakeholder review during the hearing process.

c. The Need to Ensure that the Impairment Does Not Worsen

An increase in methylmercury sources would increase fish tissue methylmercury concentrations. An implementation program that controls both methylmercury and inorganic mercury would address concerns that the impairment could get worse if the control program ignores activities, such as wetland restoration, population growth, and changes in water management, which could increase methylmercury in the Delta. As noted earlier, staff estimated before the April 2008 hearing that about 5% of overall tributary mercury loading to the Delta results from modern point sources, about 65% results from background sources (naturally mercury-enriched soils, atmospheric deposition, and geothermal springs), and about 30% from historic mining activities. (As noted earlier, staff is currently re-evaluating these estimates based on CalFed data published in October 2008.) Background mercury loading is high enough that even if legacy mercury in the tributary watersheds were reduced to zero, methylmercury concentrations in Delta waters and fish would be expected to be elevated in some areas of the Delta, such as the Yolo Bypass.

The current mercury concentration in Sacramento Basin sediment, the largest source of sediment to the Delta, is about 0.2 ppm. The background mercury level of sediment coming down from the upper Sacramento River watershed is about 0.1 ppm. So, hypothetically, if we could control all the legacy sources, eventually much of the Delta would come to equilibrium with sediment concentrations at about 0.1 ppm. This is still enough raw material for some wetlands to produce elevated concentrations of methylmercury. Also, some areas of the Delta where extensive wetlands restoration projects are underway are particularly influenced by watersheds that are naturally mercury-enriched (e.g., Cache, Marsh, and Putah Creeks and other Coastal Range watersheds). In addition, reducing legacy mercury would likely have little impact on how much methylmercury would be discharged by wastewater treatment plants. For most municipalities, levels of inorganic mercury and methylmercury are low in drinking water sources, but are high in influent entering the municipal wastewater treatment plants (WWTPs). Depending on the effectiveness of WWTP treatment processes, methylmercury loads could increase as municipalities grow.

As a result, even if we could return the ecosystem to background levels of mercury in the sediment, we would still need to be concerned about some sources of methylmercury. And, as was mentioned above, it is unlikely that all the sources of legacy mercury can be remediated and we anticipate that significant reductions in legacy loads entering the Delta will take many decades.

d. Best Available Science

The California Bay Delta Authority has invested more than $30 million in scientific investigations to build the knowledge of mercury sources, transport and cycling in the Bay-Delta ecosystem. As summarized in the *Mercury Strategy for the Bay-Delta Ecosystem*,[1] independent expert scientists determined that:

- The problem with mercury in the Bay-Delta aquatic ecosystems can be defined as biotic exposure to methylmercury;
- The production of methylmercury in the environment is a key process affecting methylmercury concentrations in Delta biota at all trophic levels; and
- Natural processes and human activities, possibly including ecosystem restoration projects, that alter the net production of methylmercury can influence the abundance of methylmercury in the ecosystem and the associated exposure of wildlife and humans who consume fish and other aquatic organisms.

Furthermore, the authors of the *Mercury Strategy for the Bay-Delta Ecosystem* stated: "We believe that changes in bioavailability or methylation rates have much greater potential to significantly increase methylmercury exposure in this ecosystem than do changes in the spatial distribution of total (mostly inorganic) mercury. Studies in other aquatic ecosystems have shown that stimulation of methylation can increase the abundance of methylmercury and its uptake in biota by 10- to 20-fold, even in lightly contaminated environments where no mercury was added." (Weiner *et al.,* 2003 page 22.)

Based on the best available science developed by Delta-specific source analyses and cycling studies and other published nationwide and international research, staff determined that the science is present to support a TMDL based on methylmercury and an implementation program that is based on controlling both methylmercury and inorganic mercury. In particular, staff calculated the assimilative capacity of the Delta in terms of methylmercury in Delta water. Several studies in northern California (e.g., the Delta and the Cache Creek and Guadalupe River watersheds), and elsewhere in the United States have found statistically significant, positive correlations between methylmercury in water and aquatic biota.[2] The Delta-specific mathematical

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[1] Wiener, J.G., C.C. Gilmour and D.P. Krabbenhoft. 2003. *Mercury Strategy for the Bay-Delta Ecosystem: A Unifying Framework for Science, Adaptive Management, and Ecological Restoration.* Final Report to the California Bay Delta Authority for Contract 4600001642 between the Association of Bay Area Governments and the University of Wisconsin-La Crosse, 31 December.

[2] An evaluation of the Delta-specific fish-water methylmercury correlation is in Chapter 5 of the February 2008 Delta TMDL draft staff report, and full citations for the references for other studies (Brumbaugh *et al.*, 2001; Foe *et al.*, 2002; Slotton *et al.*, 2003; Tetra Tech, Inc., 2005a; Sveinsdottir and Mason, 2005) are in Chapter 9.

relationship between methylmercury in water and methylmercury in fish indicates that the concentration of methylmercury in the water explains more than 90% of the methylmercury concentration in fish. This is a very significant statistical relationship.

The Delta and other local and nationwide studies indicate that the concentration of methylmercury in water is a primary factor in determining how much methylmercury is in fish and that the most direct way to reduce methylmercury in fish is to reduce the concentration of methylmercury in water. A detailed review of the science is provided in the February 2008 Delta TMDL draft staff report. The Delta TMDL's two scientific peer reviewers were specifically asked to evaluate the linkage between methylmercury in fish and water. One scientific reviewer fully supported the linkage and one did not comment on it. The Water Boards have incorporated similar science in other TMDL control programs. The Central Valley Water Board adopted a methylmercury TMDL for the Cache Creek and its tributaries and the San Francisco Bay Water Board staff recently adopted a TMDL implementation plan for the Guadalupe River watershed that incorporates a methylmercury linkage and methylmercury allocations for reservoirs.[3]

Although current science supports a program that defines the Delta's assimilative capacity and allocations in terms of methylmercury and addresses both inorganic mercury and methylmercury sources, control methods for all methylmercury sources have not yet been developed. Staff's recommendation for a Phase 1 study period is based on the premise that understanding the differences between individual methylmercury sources – that is, understanding why some sources have high methylmercury concentrations while others nearby have low concentrations – will lead to the development of effective methylmercury management practices that can be implemented during Phase 2.

Some dischargers already achieve low methylmercury discharges. For example, 24 of 64 Central Valley municipal WWTPs have average effluent methylmercury concentrations less than 0.06 ng/l, and 14 of those discharges have average effluent methylmercury concentrations less than 0.03 ng/l. In contrast, 19 municipal WWTPs discharges have average effluent methylmercury concentrations greater than 0.2 ng/l, and seven of those have average effluent methylmercury concentrations between 1 and 2.9 ng/l. Similarly, ongoing studies in the Delta source region indicate that some wetlands may have little net methylmercury production or even act as sinks for methylmercury – that is, less methylmercury comes out than goes in – while others (especially seasonal wetlands) act as a net source of methylmercury, some as substantial sources and others as small sources.

[3] See the following website for Resolution R2-2008-0089 (October 2008), the adopted Basin Plan Amendment, and the final staff report by Austin and others (September 2008): http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/guadaluperivermercurytmdl.shtml

Several stakeholders have stated that methylmercury sources should not be regulated (i.e., given an allocation) until methylmercury controls have been developed. Some stakeholders expressed a willingness to conduct control studies. Other stakeholders stated that dischargers – especially those that have public benefit mandates or are small – should not be required to do the basic science of developing methylmercury controls and that the State should expend funds to develop more of the basic science and to clean up legacy mercury sources.

There is precedence for the Water Boards to require dischargers to conduct control studies as a component of TMDL implementation programs, including dischargers that have public benefit mandates. For example, the dissolved oxygen TMDL for the Stockton Deep Water Ship Channel allocated equal accountability for excesses of net oxygen demand to entities responsible for flow, channel geometry, and sources of oxygen-demanding substances and required responsible entities to engage in studies of the causes. The estimated cost for the studies at the time the Central Valley Water Board adopted the dissolved oxygen TMDL was $15.6 million.

In addition, the San Francisco Bay's mercury TMDL control program requires San Francisco Bay dischargers to address methylmercury. In particular:

- NPDES dischargers, dredging projects, and wetland projects are required to monitor methylmercury and do methylmercury studies.
- Dredging and disposal operations are required to demonstrate that their activities do not increase the bioavailability of mercury.
- Wetland restoration projects are required to be designed and operated to minimize methylmercury production and result in no net increase in mercury or methylmercury loads to San Francisco Bay.

Also, the Guadalupe River TMDL implementation program incorporates requirements for technical studies to develop and evaluate methods to reduce methylmercury production in reservoirs and Lake Almaden and other methods that have the potential to reduce bioaccumulation of mercury. The Santa Clara Valley Water District's pilot project to reduce methylmercury in Lake Almaden has shown very positive results.[4]

Consequently, staff does not consider it unreasonable for the Central Valley Water Board to require in-Delta and upstream methylmercury sources to conduct control studies as a component of the Delta mercury control program. Ultimately, it would be the responsibility of the dischargers to address their discharges. However, staff will

[4] Drury, D. 2007. Santa Clara Valley Water District. Reduction of methyl mercury concentrations in an urban lake using a solar-powered circulator. Presentation at the 2007 Annual International Symposium of the North American Lake Management Society. October. http://www.nalms.org/Conferences/Orlando/PDF/Orlando2007Program.pdf

work with dischargers to help them design and implement cost effective methylmercury characterization and control studies.

2. Should small methylmercury sources be required to reduce their methylmercury loads?

Several dischargers have stated that the Delta control program should not require small source categories in the Delta, such as municipal stormwater and agriculture, to conduct studies and reduce their methylmercury loads and that instead, the Delta control program should focus on nonpoint source categories that discharge the most methylmercury in and upstream of the Delta. However, when you look at how many individual discharges there are in each source category in the Delta, almost all of the individual discharges are small. And, although the tributary inputs are substantial, no doubt they also contain a similar distribution of individual discharges. Examples of small discharges include most wastewater treatment plants, individual farm fields, and wetlands where water flow is managed in discrete units. It is the sum of all of the individual discharges in the Delta and its tributary watersheds that impairs the Delta. Each of the individual discharges has its own intrinsic value and financial constraints.

Staff recommends that WWTPs, MS4s, wetlands, irrigated agriculture, and new water management activities evaluate and develop management practices to reduce their methylmercury loads, such that each takes responsibility for its contribution to the impairment. Staff does not recommend that every individual NPDES, MS4, and agricultural and wetland landowner individually conduct a study, but instead recommends coordinated studies. Also, load allocations for irrigated agriculture and wetlands in the Delta are assigned on a Delta subarea basis; that is, allocations within each subarea are grouped for these two categories. Agricultural and wetland landowners are not required by the proposed program to individually evaluate and reduce their loads; however, there needs to be a coordinated effort to identify significant methylmercury sources and develop management practices for these discharges.

At the April 2008 hearing, several stakeholders pointed out that, even if all sources in the Delta conduct studies and reduce their methylmercury discharges, the Delta's mercury problem will not be solved and that it would not be fair to require small, in-Delta sources to implement methylmercury controls when upstream sources have not been given similar requirements. Staff agrees. Discharges in the Delta, most of which are small, are being asked to address their portion of the methylmercury that is produced within the Delta and contributes to the impairment. If within-Delta sources reduce methylmercury discharges to meet the proposed allocations, measurable reductions in fish tissue levels are expected. Even though this would not solve the problem, it would make a measurable improvement. A similar, short-term improvement strategy was approved by the San Francisco Bay and State Water Boards and USEPA for the San

Francisco Bay mercury control program. And, as discussed in item #6 (page 29), staff recommends that within-Delta sources not be required to implement methylmercury controls until the Board approves TMDL programs for the upstream tributaries.

The alternative to requiring that both large and small source categories participate in studies and reduce their methylmercury loads is requiring that only the largest methylmercury source categories be required to conduct studies and reduce their methylmercury loads. That is, the largest methylmercury sources categories would be assigned more substantial load reductions. Staff does not recommend this approach for the following reasons. A source category that seems small compared to overall Delta loading may be a much larger contribution to an individual waterway in the Delta. Also, allowing exceptions for certain source categories from methylmercury control studies or reduction requirements now, instead of after the Phase 1 studies are completed, would rush judgment on which sources can and should be evaluated and controlled, and therefore could reduce the efficacy of the program. Phase 1 control studies are needed to determine which individual methylmercury discharges have feasible controls. For some individual methylmercury sources, the Phase 1 studies may indicate that there is no feasible method of reducing their methylmercury discharge.

For example, a speaker at the April 2008 hearing told the Board that drip irrigation would not work as a methylmercury control for agriculture[5] in the South Delta because it would cause salts to collect in the soil and farmers have to flush out the salts to be able to farm. Board staff confirms that drip irrigation can cause salt accumulation if the practice is used to conserve water. Drip irrigation can also be managed so that it pushes salt into the soil below the root zone. Staff anticipates that some control measures, like drip irrigation, will be reasonable for certain parts of the Delta but will be unacceptable for other parts, and that there may be no feasible controls for some individual discharges. During Phase 1 of the proposed control program, staff would work with dischargers to identify a range of possible management practices. For instance, Phase 1 control studies could evaluate the effects of drip irrigation and tailwater recovery systems on methylmercury and salt in the fields, as well as methods to control methylmercury in irrigation drainage channels. At the end of Phase 1, the Board would evaluate the range of feasible management practices and their potential costs and environmental impacts and possible re-directed effects; reconsider the methylmercury allocations; and, if needed, adjust the allocations for particular sources that do not have feasible methylmercury control options, or allow offset projects.

During the April 2008 hearing, stakeholders noted that, until methylmercury studies are completed, only mercury minimization efforts such as those approved by the USEPA for

[5] Potential control methods identified in the February 2008 staff report are only for the purpose of estimating a range of potential costs for the proposed control program evaluating potential environmental impacts.

the TMDLs for Minnesota and other Northeast states make sense for small sources. Staff agrees that it does not make sense for small sources (or large sources) to be required to implement methylmercury controls before additional studies have been completed, which is why staff proposes a phased approach for implementing the TMDL.

The TMDLs for Minnesota and seven other Northeast states will lower loads of inorganic mercury, in part, by requiring wastewater treatment plants to implement mercury minimization plans to reduce mercury entering and exiting the plants, and by other state or regional mercury reduction efforts, including disposal and product bans, that limit mercury in household and industrial uses. The draft Delta Basin Plan amendment requires that large NPDES facilities and MS4s in the Delta and its tributary watersheds downstream of major dams develop and implement mercury minimization plans during Phase 1. Many of the NPDES dischargers are already required to do this by their existing NPDES permits. Section 4.3 and Appendix C of the February 2008 Delta Basin Plan amendment draft staff report describe reasonably foreseeable methods of compliance with these requirements, many of which mirror the mercury minimization measures incorporated in the Minnesota TMDL.

Mercury minimization measures have the potential to reduce NPDES methylmercury discharges, possibly enough for some facilities to achieve staff's proposed methylmercury allocations. For example, during the April 2008 hearing, SRCSD's District Engineer said that the SRCSD WWTP's effluent total mercury and methylmercury decreased as a result of influent total mercury decreases associated with the initiation of their "Be Mercury Free" source control program. Board staff's calculations indicate that the SRCSD WWTP's methylmercury discharge during the last three years (~95 g/yr) comes very close to meeting staff's proposed allocation for the SRCSD WWTP (90 g/yr). By focusing on reducing inorganic mercury discharges, some facilities may be able to achieve their methylmercury allocations.

3. Should future water management, flood control, dredging, and salinity related projects be required to evaluate their potential impacts on methylmercury levels in the Delta and mitigate for any methylmercury increases?

Scientific information indicates that some water management activities may affect methylmercury levels in the Delta. For instance, methylmercury production is a function of many factors, including sulfate concentrations in the water. Changing water flows and release schedules to meet salinity standards in the Delta directly impacts sulfate concentrations, which in turn affects methylmercury levels. The Yolo Bypass is an area with high methylmercury production. Routing more flood flows down the Yolo Bypass or keeping the Yolo Bypass flooded for longer periods may increase methylmercury production and discharge. Additionally, new reservoirs created in mercury-enriched areas have been shown to increase methylmercury levels in fish in the reservoirs.

For these three reasons (salinity control, additional bypass flooding, and new reservoir creation), staff recommends that the agencies responsible for water management activities be required to evaluate methylmercury production if changes are made to current water management operations. Note that there are no specific requirements for current operations. There would only be requirements for the agencies to evaluate methylmercury production and control or mitigate methylmercury load increases, if changes are made to current operations. Changes are defined in the proposed Basin Plan amendment as new or modified weirs in the Yolo Bypass, changes to the current Central Valley Project – Operation Criteria and Plan (OCAP, June 2004), new or expanded reservoirs, and changes to water storage and release schedules.

Staff was aware of water management agencies' concerns and developed language to address water quality and flow mandates. The proposed Basin Plan amendment recognizes that other water quality and flow mandates exist and would require implementation of feasible control measures only if they do not conflict with other mandates. Water management agencies would need to evaluate methylmercury impacts when evaluating the environmental impact of their projects in compliance with the California Environmental Quality Act (CEQA).

At the April 2008 hearing, DWR named several concerns with the proposed Basin Plan amendment. DWR had concerns about:

- Integrating the Basin Plan amendment with other programs;
- Delays to flood control projects that could be caused by requirements for methylmercury studies and control measures;
- Requirements for Cache Creek Settling Basin improvements;
- Endangered species recovery;
- Water management and changes to the Central Valley Project – Operations Criteria and Plan;
- Requirements for dredging projects; and
- Formation of a technical advisory committee.

Since the April 2008 hearing, Board staff has had several meetings with DWR staff and has met with the Bay Delta Conservation Plan (BDCP) Steering Committee and the Other Stressors Work Group. Staff's initial responses to DWR's concerns are provided below. These responses will likely evolve as additional meetings take place.

a. Integrating the Basin Plan amendment with other programs.

One of DWR's main suggestions was to integrate the Basin Plan amendment with other programs that are currently underway (e.g., BDCP, Delta Vision, and FloodSAFE). Staff agrees with DWR that this is a high priority and, as noted above, has already begun a series of meetings with BDCP. Collaboration with DWR, other public agencies, and Delta programs should continue through Phase 1 of the Delta TMDL in order to integrate implementation of methylmercury controls (TMDL Phase 2) with the other programs. Completion of the Phase 1 methylmercury characterization and control studies will provide critical information necessary for this integration. The methylmercury studies can be completed in conjunction with the ongoing development of habitat restoration projects and other Delta programs. The methylmercury studies likely will not take place without the Board adopting a Basin Plan amendment.

b. Delays to flood control projects that could be caused by amendment requirements for methylmercury studies and control measures.

DWR is concerned that the proposed amendment's requirements for methylmercury studies and control measures could significantly delay flood control projects, particularly emergency repairs. During the April 2008 hearing, staff proposed that language be added to the draft Basin Plan amendment to exempt emergency flood control projects. Emergency flood control projects, such as a response to a levee break, would not be required to address mercury or methylmercury discharges. (See also #11 on page 33.) For flood control projects that are not related to emergencies and are usually part of an advanced planning effort, the mercury/methylmercury requirements would apply. DWR would need to consider mercury requirements when planning non-emergency projects.

Stakeholders noted during the April 2008 hearing that methylmercury mitigation projects (1) need to evaluate other laws and TMDLs, (2) need to have a balanced approach, and (3) need to determine other unintended water quality consequences and other physical impacts of implementing methylmercury mitigations. Staff agrees that this is the approach that needs to be taken. If a new water management project is proposed, such as new reservoirs, changes to flood control operations, salinity control, or dredging, the project proponent should evaluate the project's potential effects on methylmercury levels in the Delta and tributaries in addition to other water quality concerns, as well evaluate the potential consequences of implementing methylmercury controls should the project evaluation indicate that methylmercury mitigation may be necessary. This evaluation should be considered during the environmental analysis (in compliance with CEQA requirements) of the project and mitigations considered and incorporated when and where appropriate.

c. Requirements for Cache Creek Settling Basin improvements.

DWR staff stated that because the Cache Creek Settling Basin is a federal flood control project, changes to it would require new modeling efforts, acceptance from upstream communities, and U.S. Army Corps of Engineers and Congressional approvals. DWR also noted that the Cache Creek Settling Basin has operated for decades and has provided a net benefit for the mercury problem by removing mercury that would otherwise enter the Delta.

Staff recognizes the Cache Creek Settling Basin was designed and built predominately with federal funds to prevent sediment from entering the Yolo Bypass and that the State was to assume responsibility for continued basin operations and maintenance. The final Feasibility Report and Environmental Statement (February 1979) for the project envisioned improvements to the basin and periodic sediment removal to maintain the design life of the basin of 50 years. According to the Final General Design Memorandum (January 1987), the design of the basin included constructing the perimeter levees to final elevations and replacing the existing cobble weir with a roller compacted concrete weir. These improvements were made in 1993. The plan also included raising the weir by six feet by approximately 2018 to maintain the trapping efficiency of the basin through its 50-year design life as it fills with sediment. Multiple agencies commented on the Feasibility Report and Environmental Statement and the Final General Design Memorandum. The Final General Design Memorandum contained details on the engineering and hydraulic design of the basin, including computer modeling of flood elevations.

While additional engineering, modeling, and state/federal/local approvals would without a doubt be required, the Cache Creek Settling Basin does require maintenance and improvement actions to continue to function as part of the Sacramento River Flood Control Project as required by the original project design. State, federal and local flood control agencies and upstream communities will need to coordinate to identify and address specific concerns.

In addition, the Sacramento and San Joaquin Drainage District (DWR) has a Final Order of Condemnation (1995) for easements on the land within the basin to remove sediment and change water management and flooding conditions. Having these easements should facilitate sediment management and basin improvement activities.

Staff recognizes that the process to make improvements to the Cache Creek Settling Basin is complex and lengthy. The proposed TMDL implementation plan includes a period for DWR to work with other agencies to develop a strategy for basin improvements and funding.

d. Endangered species recovery.

DWR stated that the proposed amendment could severely affect efforts to recover endangered species, particularly the Delta smelt, by impeding wetlands restoration activities. Other stakeholders have voiced similar concerns. Staff addresses these concerns under #4 on page 21.

e. Water management and changes to the Central Valley Project – Operations Criteria and Plan (OCAP).

DWR questioned proposed Basin Plan amendment requirements to conduct methylmercury studies when there are changes to the OCAP. DWR was unclear if the proposed Basin Plan amendment requires studies if changes are made pursuant to any OCAP revisions, or if changes are made in the OCAP permit from the Board. DWR was concerned that the requirement for studies makes it difficult to implement OCAP changes in a timely manner.

The proposed Basin Plan amendment requires studies if changes are proposed for the OCAP. The OCAP contains the current operating procedures for the Central Valley Project. The intent of this requirement is to have mercury and methylmercury impacts, controls, and mitigations evaluated and considered as part of the planning process for changes to OCAP. Only those mercury and methylmercury controls that would not conflict with other water quality and flood control mandates would be required to be implemented. If studies are coordinated with other agencies, then the impact on DWR during planning of changes to OCAP could be lessened.

Changes to OCAP that trigger the need for mercury and methylmercury studies could be further restricted to just those changes that would require a revised biological opinion from the U.S. Fish and Wildlife Service. Board staff will work with DWR staff to develop draft Basin Plan amendment language.

f. Requirements for dredging projects.

The draft Basin Plan amendment requires that dredging activities and activities that reuse dredge material in the Delta minimize increases in methylmercury and total mercury loads to Delta waterways and that methylmercury concentrations in discharge from dredge settling ponds be no greater than the receiving water methylmercury concentrations. The intent of this requirement is to minimize dredging project impacts on methylmercury levels in Delta waterways.

DWR stated that it may be impossible to reduce dredge material return flow to zero and that the draft Basin Plan amendment could require dredge projects to dispose of return

flow at off-site locations, possibly at hazardous-material disposal sites. The draft Basin Plan amendment does not require the effluent to have zero methylmercury, but to be equal to or less than the receiving water methylmercury concentration.

At this time, it is unknown whether the disposal ponds increase methylmercury levels in dredge material pore water or whether return flows have elevated methylmercury levels compared to the Delta's surface waters. Holding the return water in the pond longer (for settling or photodegradation of the methylmercury) or finding other uses for the return water should be evaluated as potential means to minimize methylmercury increases in surface waters. To address DWR's concerns, staff will modify the draft Basin Plan amendment language to allow DWR to monitor return water methylmercury and evaluate options for methylmercury controls during Phase 1, and to delay implementation of any requirement for control of methylmercury in return water until Phase 2.

DWR is also concerned that the proposed Basin Plan amendment could require projects to dredge down to clean dirt, which could undermine the levees, or otherwise not allow necessary channel clearing and other planned projects (e.g., the South Delta Improvement Program). Staff worked extensively with USEPA staff to draft dredging requirements that were consistent with dredging requirements in other Water Board regions and that would protect the environment while being technically and economically feasible. It was never Board staff's intent to require significant over-excavation to clean soils such that levee stability would be compromised. The proposed amendment requires pre-dredge sediment coring to determine pre-dredge surface mercury concentrations and concentrations that would be exposed after dredging. The proposed amendment does not require DWR to dredge to clean sediment. As a result of discussions with DWR, Board staff recommends that DWR or other agencies that conduct dredging projects evaluate methyl and total mercury loads from dredging and dredge material reuse activities and develop management practices to minimize increases in methyl and total mercury loads. No mitigations would be required during Phase 1. If feasible management practices are developed, then the Board could consider these as requirements for Phase 2.

If a dredging project is performed just for channel maintenance, it is likely that the sediment mercury concentration would not be greater with depth because deposited sediments typically reflect a mixture of upstream sediments that were recently deposited. Conversely, it is conceivable that flood flows could deposit a mercury-enriched layer in a previously dredged reach, or that there could be a mercury-enriched layer in an area that has not been previously dredged.

Appendix C (Cost Consideration Calculations) of the Delta Basin Plan amendment draft staff report identified two reasonably foreseeable methods of compliance with the

proposed amendment if dredging exposes a mercury-enriched sediment lens: (1) dredge deeper until a horizon with lower mercury levels is exposed, or (2) continue with the project as proposed, but conduct post-project monitoring to evaluate the process of natural sedimentation covering the exposed surface. These methods or different methods not identified by staff could be evaluated by DWR.

If a dredging project were to expose mercury-enriched sediment, and DWR were to conduct post-project monitoring, it is reasonably foreseeable that natural sedimentation would adequately cover the exposed surface with sediment having a lower level of mercury. Such post-project monitoring would be minimal (see Appendix C, Section I.2, of the Delta BPA report) and this information could be used for future projects.

However, if DWR finds that the exposed surface is not adequately or rapidly covered by lower-mercury sediment, then some additional control (for example: dredging deeper to expose a sediment layer with lower mercury concentrations, capping sediment, aeration, or participation in an offset program) might be considered for the current or future project to reduce the amount of mercury or methylmercury fluxing from the newly-exposed sediment. Staff will add language to the draft Basin Plan amendment to indicate that any mercury controls that would affect levee stability will not be required.

A comment was made by another stakeholder during the April 2008 hearing that the draft Basin Plan amendment allows wetlands to add methylmercury to the environment, while at the same time the draft amendment requires no net increase from the dredging projects. The concern is the inconsistency of dredging projects having more stringent requirements than wetlands, even though dredging projects are also beneficial (i.e., dredging projects protect millions of people from flooding).

The draft amendment presented at the April 2008 hearing has the following requirements for dredge return flows and dredge material reuse projects:

- “When approved dredge material disposal sites are utilized to settle out solids and return waters are discharged into the adjacent surface water, ensure that return flows do not have methylmercury concentrations greater than the receiving water concentration.”
- “Ensure that reuse of dredge material at aquatic locations, such as wetland and riparian habitat restoration sites, does not result in a net increase in methylmercury discharges from the sites. Projects that propose to dispose dredge material to aquatic sites shall conduct monitoring to demonstrate that their activities are accomplished in a manner that does not increase the bioavailability of mercury.”

In contrast, the draft amendment requires new wetland projects to take part in characterization studies and, if they are found to increase methylmercury loading to the Delta, to "implement newly developed management practices as feasible".

In response, staff will modify the draft Basin Plan amendment so that requirements for dredge material reuse projects are similar to those for new wetland restoration projects to address this inconsistency. Also, as noted above, staff will modify the draft amendment language to allow dredge projects to monitor return water methylmercury and evaluate options for methylmercury controls during Phase 1, and delay implementation of any requirement for return water methylmercury control until those monitoring and evaluation efforts have been completed.

g. Formation of technical advisory committee.

DWR suggested during the April 2008 hearing that the Board form a technical advisory committee early, if not as soon as possible. Staff agrees with this suggestion, and has already begun developing a framework for the advisory committee and seeking out potential funding sources.

4. Should wetland managers and planners be required to conduct Phase 1 studies and develop methylmercury management practices?

Staff recommends that wetland managers and planners be required to participate in the development and implementation of a study plan for the Phase 1 methylmercury characterization and control studies and studies to evaluate methylmercury management practices because:

- Existing wetlands provide a substantial amount of methylmercury loading, and
- Given how much wetland restoration is planned in the Delta and Yolo Bypass, it may be difficult, if not impossible, to achieve safe fish mercury levels for wildlife in all areas of the Yolo Bypass and Delta if the control program does not address methylmercury production by wetlands.

Staff does not recommend that every wetland manager and landowner conduct a study individually, but instead recommends coordinated studies. Also, load allocations for wetlands in the Delta are assigned on a Delta subarea basis; that is, allocations for wetlands within each subarea are grouped. The proposed program does not require wetland managers and owners to individually evaluate and reduce their loads. Staff believes that there should be a coordinated effort to identify significant methylmercury sources and develop management practices for these discharges.

The CalFed Bay-Delta Program committed to restoring up to 90,000 acres of wetlands in the Delta. This represents a three to four times increase in wetland acreage. Much of the restoration is expected to take place in the Yolo Bypass, which is directly downstream of Cache Creek, a major source of inorganic mercury to the Bypass. When flooded, the Bypass has some of the highest mercury concentrations measured in fish in the Central Valley. If the Delta program does not include controls for methylmercury production in wetlands (at the same time it addresses legacy mercury from upstream), fish within or downstream of the wetlands may become more contaminated. The 2000 CalFed Record of Decision found that extensive restoration efforts in the Delta have the potential to increase exposure of people and wildlife to methylmercury and that methylmercury mitigation should be developed for wetlands prior to their construction.

The CalFed Record of Decision's recognition of the potential for wetlands restoration to increase methylmercury underlies staff's recommendation that methylmercury studies be conducted for all types of wetlands. The CalFed Record of Decision and Ecosystem Restoration Program Plan indicated that the potential for wetlands restoration to increase methylmercury is an important concern and that such increases should be mitigated. Staff recognizes, though, that other agencies and entities are proceeding with plans for recovery of endangered species and restoration of habitat. There is time during Phase 1 to identify habitat types or locations that are critical to species recovery efforts and to exempt them, if necessary, from on-site methylmercury controls. Even in critical habitat areas, the basic methylmercury characterization studies should be conducted to see if there are any feasible and reasonable practices that could be implemented so that other species in the wetland or downstream are not harmed by methylmercury produced by the critical habitat area. The proposed methylmercury control program purposely does not prevent wetland projects from moving forward.

Phase 1 studies may show that methylmercury production in some wetlands cannot be controlled without impacting habitat function. At the end of Phase 1, then, the Board may find that the benefits of particular wetlands or wetland types outweigh the detrimental effects of methylmercury management and determine that those wetlands are exempt from implementing methylmercury control projects. Alternatively, the Board may find that reductions in methylmercury from wetlands are feasible and should be required. Regardless, without the Phase 1 studies, this will be a very difficult decision for the Board to make.

During the upcoming stakeholder process, staff and stakeholders may consider options for expanding the characterization and control studies to include upstream wetlands and/or for limiting required participation (e.g., public agency-managed wetlands or wetland areas above a minimum acreage).

5. How should the Board address mercury offset projects?

At the April 2008 hearing, this question was divided into four questions. Each question is addressed in a separate section:

a. What should be the approval process for an offset project?

b. How should credit from the offset program be applied?

c. Is Sacramento Regional County Sanitation District's project appropriate for a long-term offset project?

d. Is it a problem that the proposed offset project is not in the same watershed as the District's discharge?

a. What should be the approval process for an offset project?

At the April 2008 hearing, staff presented three possible methods the Board could use to approve an offset:

i. Adoption of a discharger-specific mercury offset project (for the Sacramento Regional County Sanitation District, SRCSD) in the proposed Basin Plan amendment for the Delta Mercury Control Program,

ii. Approval of the offset project in waste discharge requirements, or

iii. Approval of the offset project in a Central Valley Water Board resolution.

Another option not presented at the April 2008 hearing is to have the Executive Officer approve an offset project. The approval processes vary in their requirements for review, timeline for approval or change, and benefit to the discharger, as discussed below. Staff recommends that pilot offset projects during Phase 1 of the proposed control program be approved by a Central Valley Water Board resolution.

There are several pros and cons to each of the approval methods. Using the Basin Planning process to evaluate and approve an offset project provides a thorough public and scientific review process, including a mandatory scientific peer review. In addition, incorporating an offset project into the Basin Plan provides a surety for the discharger that the Board cannot easily change the crediting system after the offset project is implemented, making it more likely that dischargers will conduct potentially expensive offset projects. However, this surety of including the project in the Basin Plan also has a negative side. Offset projects for mercury are a new concept and are likely to change over time. If the details of a project are adopted into the Basin Plan, those details cannot be changed without a lengthy, expensive process to modify the Basin Plan.

Offset projects could be approved in waste discharge requirements (WDRs) or Board resolutions. As part of these approval processes, projects could be required to receive

scientific and public review prior to Board approval. A disadvantage of the WDR option is the chance that the Board might change terms of the offset project at the end of each five-year WDR review cycle. WDRs may not give project proponents long-term surety for undertaking expensive offset projects. On the other hand, a Board resolution could approve an offset project for a longer period, thus increasing surety for the discharger.

Lastly, another option would be to have the Executive Officer review and approve offset projects. There could be opportunity for scientific and public review. However, like the waste discharge requirement alternative, this option may not give the project proponents long-term surety for undertaking expensive offset projects.

Staff recommends that the Delta TMDL Basin Plan Amendment include guidance for selection and approval of Phase 1 pilot offset project, but not provide terms for specific offset projects. Instead, staff proposes that the Central Valley Water Board approve specific Phase 1 offset projects through resolutions. This option allows a period of scientific and public review and comment prior to the resolution being considered by the Board at a public meeting. A resolution could provide the details of an offset project and schedules for creating and using credits and be effective over several NPDES permit cycles. Adoption of a Basin Plan Amendment containing an offset project framework and subsequent approval of specific projects by resolution minimizes the inflexibility associated with changing the Basin Plan while giving some long-term surety for the project proponent.

The draft Basin Plan amendment does not include SRCSD's specific proposal or guidance for Phase 2 long-term offset projects. SRCSD's offset project has not undergone scientific review. If the Board decides that the District's project should be included in the Basin Plan, or that a framework for long-term offset projects should be included in this amendment, then the long-term offset program and SRCSD's project must go through the scientific peer review process and be circulated for public comment. Additional peer review would be required to ensure that long-term offset projects would enable all Delta areas to achieve the proposed fish tissue objective.

b. How should credit from the offset program be applied?

The primary reason for a discharger to conduct an offset project is to satisfy their permit requirements by acquiring pollution reduction credits instead of reducing methylmercury and/or mercury in their discharge. Credits are particularly important if it is technically not possible to decrease the methylmercury in the discharge. The proposed draft Basin Plan amendment requires dischargers to conduct Phase 1 studies to determine the feasibility of reducing their methylmercury discharges even if they submit a proposal for a pilot offset project.

Staff recommends that dischargers doing offset projects be allowed to 'bank' their mercury and/or methylmercury credit for use later. For example, for sediment removal in the Cache Creek Settling Basin, it is likely that a large removal project every few years will be more economical than smaller, annual removals. Credits could be banked and then used over several years to offset yearly discharges. Credit for mercury removal during Phase 1 pilot offset projects could be banked for several years and not used until towards the end of Phase 2, when a discharger might otherwise have to implement measures to reduce the methylmercury that it discharges.

Some related questions need to be considered as pilot and long-term offset programs are developed, including:

i. How much credit can be accumulated?

ii. Can enough offset credit be accumulated so that a discharger never needs to take action to reduce its effluent methylmercury?

iii. Should the credits last forever, or should unused credits "expire" at a set time?

The proposed Phase 1 offset project guidance sets no limits on the amount of credit that can be accumulated, but it does set an 'expiration time' by requiring that credits be used to extend Phase 2 allocation compliance dates no longer than five years, not to extend beyond 2035. The proposed Phase 1 offset guidance does not address dischargers who wish to accumulate sufficient offset credits in order to postpone or eliminate the need to reduce effluent mercury or methylmercury in their discharge. These issues need to be addressed as part of the long-term, Phase 2 offset program. The Board could decide to allow accumulated credit during Phase 1 to be used for longer periods, or could choose to establish no time limit at all. However, as discussed in the following sections, not having an expiration date for credits accrued during Phase 1 would result in a project being considered a long-term, rather than pilot, project and would raise the same concerns as those for a long-term offset program.

At the April 2008 hearing, a stakeholder asked if growers could participate in the offset program, such as contributing towards a mine cleanup. Staff affirms that growers could voluntarily contribute towards a mine cleanup. However, at this time, there is no requirement for growers to participate in remediating mines. Phase 1 of the proposed control program would require irrigated agriculture in the Delta to evaluate methylmercury production on agricultural lands and investigate controls for direct methylmercury discharges to the Delta. If the Phase 1 studies indicated controls were not feasible for a particular agriculture area, then growers could participate in a Phase 2 offset program to comply with their allocations.

For an offset project, SRCSD proposes to remove accumulated sediments from the Cache Creek Settling Basin, which will reduce the amount of mercury discharged into

the Yolo Bypass. Board staff and SRCSD have not come to agreement on how credit for removing sediment from the settling basin should be applied to the methylmercury discharges from SRCSD's wastewater treatment plant (WWTP). If, for example, SRCSD wants to accumulate credit for 100 grams of methylmercury discharged by their WWTP, then the offset project could reduce methylmercury loads from the settling basin by 100 grams (or more to take into account uncertainty or a margin of safety). However, it is difficult to establish how much sediment should be removed from the basin to equate to a 100-gram decrease in methylmercury. Once the details of the project and a method to calculate sediment removal rates and corresponding methylmercury reductions have been developed, the project will be sent to independent, scientific peer reviewers.

c. Is Sacramento Regional County Sanitation District's project appropriate for a long-term offset project?

In January 2007, SRCSD proposed language for the Basin Plan containing SRCSD's offset proposal to acquire credits for reducing mercury elsewhere than in its effluent. SRCSD's proposed Basin Plan language does not include a termination date for the proposed project, which seems to imply that the project could continue indefinitely. The answer to the question, "Is SRCSD's project appropriate for a long-term project?", is connected to the next question about where the offset project is located in relation to the WWTP discharge, as well as an offset credit strategy (discussed in "b" above). If the project were in the same watershed as SRCSD's discharge, there would be direct benefits to the impairment in the SRCSD's receiving water. Because the Cache Creek Settling Basin project is in a different watershed, staff considers it appropriate as a pilot project with a limited time for credit accrual and use, but not adequate for offsetting SRCSD's discharge indefinitely.

For Phase 1, staff recommends allowing pilot offset projects in a watershed other than the watershed where the project proponent has its discharge because early removal of mercury from the environment, especially from the Yolo Bypass, is beneficial. Staff has no recommendation at this time for long-term offset projects that take place in different watersheds. However, these will be among the major policy decisions that will need to be made when the Board considers a Phase 2 offset program at the end of Phase 1, or right now if the Board decides to include the District's proposed long-term offset project in the current Basin Plan amendment.

d. Is it a problem that the proposed offset project is not in the same watershed as SRCSD's discharge?

At the April hearing, stakeholders commented that the offset program should be set up like a regional bank account that does not use watershed or other 'immediate proximity'

limits, but instead puts resources where there is opportunity to make rapid improvements. Staff agrees that the large loads of total mercury from Cache Creek make an offset project in the Cache Creek Settling Basin worthwhile for improving methyl and total mercury loads relatively quickly. Improvements to the settling basin will directly benefit wetland restorations in the Yolo Bypass. Board members will decide how long credit from an offset project in the settling basin should last. If a long-term offset project in the Cache Creek Settling Basin is allowed, the SRCSD WWTP will not have to address its methylmercury load, and the reach of the river downstream of the WWTP discharge will continue to be influenced by SRCSD's methylmercury discharge.

The Cache Creek Settling Basin discharges to the Yolo Bypass about 35 miles above the confluence of the Yolo Bypass and the Sacramento River. The Yolo Bypass and Sacramento River confluence is more than 30 miles down river of the SRCSD's WWTP discharge. Although the southern Yolo Bypass and the Sacramento River at the District's discharge are both within the legal Delta boundary, they are in different watersheds of the Delta. The Sacramento River at the SRCSD WWTP's discharge rarely experiences tidal flow reversals. This means that a Cache Creek Settling Basin project will not result in lowering mercury levels in the segment of the Sacramento River downstream of the SRCSD WWTP discharge. This is a human health concern because this part of the river is a very popular fishing location and fish there have been found to have elevated mercury levels.

In its Localized Mercury Bioaccumulation Study,[6] SRCSD concluded that there is no significant hotspot due to SRCSD WWTP effluent to the Sacramento River, and that SRCSD WWTP effluent contributes about the same amount of methylmercury to biota as it does to water in the river. SRCSD found that four out of six fish and clams species sampled had methylmercury concentrations about 10% greater downstream from the discharge than upstream. The ratio of SRSCD WWTP methylmercury loads to river methylmercury loads was also about 10% during the study period.

A 10% increase in methylmercury from one source is substantial. Health impacts of a 10% increase in methylmercury concentration are probably hard to measure, given that methylmercury levels in different fish species and sizes eaten by people vary by more than 10%. The impact may be greater at certain times, though. Staff expects that the impact of SRCSD's methylmercury discharge on biota would be greater than 10% during dry periods, when SRCSD's effluent is less diluted by the river. During the five summers prior to the bioaccumulation study, SRCSD contributed 15 to 30% of the river's methylmercury load.

[6] SRCSD. 2008. Localized Mercury Bioaccumulation Study. Final report prepared for Sacramento Regional County Sanitation District (SRCSD) by Larry Walker Associates in association with Applied Marine Sciences, Studio Geochimica, and University of California, Davis. March 2008.

Staff also expects that SRCSD's methylmercury loads will increase because of population growth. As SRCSD's District Engineer stated at the April 2008 hearing, SRCSD WWTP's total mercury and methylmercury discharges have decreased substantially during the last five years. Its methylmercury discharge during the last three years (~95 g/yr) comes very close to meeting staff's proposed allocation for the SRCSD WWTP (90 g/yr). However, the SRCSD's 2020 Master Plan predicted that, due to population growth, the WWTP will need to increase its permitted capacity by about 17%. The California Department of Finance's population projections suggest that even greater treatment capacity will be needed by 2050.

Finally, there is an environment justice concern that allowing some discharges to increase while focusing remediation efforts in other watersheds will disproportionately affect disadvantaged communities that fish near a discharge point. Environmental justice stakeholders have said that dischargers must first show that they have done everything possible to meet permit requirements in their effluent before being allowed to comply using an offset. Environmental justice stakeholders oppose offset programs that would allow pollution reduction efforts to focus elsewhere, while allowing the discharger to continue or increase its pollutant load. Staff recommends that all methylmercury dischargers, public and private, have the opportunity to pursue offset projects once they have evaluated the feasibility of on-site methylmercury controls.

During a pilot project period, the Board may decide to allow SRCSD to continue to discharge its methylmercury loads to the river while SRCSD removes mercury elsewhere. In the long-term, though, staff believes that it may be difficult to achieve the proposed fish tissue objective in the Sacramento River if SRCSD's methylmercury is not controlled at the WWTP. Methylmercury from SRCSD's effluent is measurable in the water and biota and SRCSD's methylmercury loads are expected to increase with population growth. At the end of the Phase 1 studies, staff will provide the Board with more information about the feasibility and cost of methylmercury controls for various sources, including WWTPs. This information will allow the Board to reconsider methylmercury allocations and the extent to which offset credits can be used to satisfy the allocations.

B. Additional Amendment Options

At the April 2008 hearing, staff presented six options for new Basin Plan amendment language based on stakeholder input and comment letters regarding the February 2008 draft reports. Staff believes that these options should address many of the stakeholder concerns. Following are the options and a discussion. Staff will continue discussion of these options with stakeholders in future meetings.

6. Develop upstream TMDL control programs before starting Delta Phase 2 methylmercury implementation.

In the February 2008 draft Basin Plan amendment, staff proposed a phased approach for implementing the Delta mercury control program (see Figure 1 in Attachment 1). Under this proposed approach, the first phase of the control program would focus on:

1. Conducting methylmercury studies;
2. Implementing mercury pollution prevention measures;
3. Implementing improvements to the Cache Creek Settling Basin; and
4. Identifying other high-priority legacy mercury reduction projects.

Phase 1 would occur over an eight-year period. During Phase 1, staff would develop mercury control programs for the upstream watersheds and dischargers would have the opportunity to implement voluntary pilot offset projects. At the end of Phase 1, the Board would review the study results and reassess the Delta TMDL allocations and compliance schedules. In Phase 2, implementation of methylmercury management practices would begin, legacy mercury reduction projects would continue, and long-term offset projects could begin.

A concern of some stakeholders is that the proposed Delta control program directly addresses only within-Delta sources, and that the methylmercury from tributary inputs is not directly addressed (e.g., with Delta TMDL allocations and control requirements for methylmercury and legacy mercury sources in the upstream watersheds). Several stakeholders expressed concern over the unfairness of requiring within-Delta sources to take action to reduce their discharges before upstream sources have been identified and the Board has adopted TMDL control programs for the upstream watersheds. In addition, some stakeholders stated that within-Delta sources should not be required to take action before legacy sources have been reduced.

Earlier TMDLs have addressed mercury in Clear Lake and the Cache Creek watershed, which is a major source of mercury to the Delta. Those TMDLs focused on reducing legacy mercury loads. For the Delta, staff is recommending a phased approach that includes addressing methylmercury production and control. Under the proposed

approach, staff will develop TMDLs for upstream sources after the Delta TMDL is adopted. Staff recognizes and is not proposing that only in-Delta sources will resolve the Delta mercury impairment. However, we likely will not be able to adequately address the impairment throughout the Delta if in-Delta sources are not controlled and we only focus on upstream or legacy mercury sources.

The USEPA has supported the phased approach in written and oral comments. Staff believes that there is a need to address mercury in the Delta now because the State Water Board and the San Francisco Bay and Central Valley Water Boards have declared the Delta to be a high priority and the local impacts of the mercury impairment are great (see #13 on page 35). The Central Valley Water Board has committed to meeting its obligations to develop mercury TMDLs both within and upstream of the Delta in a timely manner. Delaying adoption of the Delta TMDL would delay methylmercury characterization and control studies that are needed for Delta and upstream control programs. Delaying the studies will postpone water quality improvements in the Delta. Of more concern, delaying the adoption of a Delta control program would be detrimental to stakeholders who depend on Delta fish for food.

Staff presented an option at the April 2008 hearing to modify the draft Basin Plan amendment to resolve these contrasting concerns. Staff recommends modifying the implementation requirements in the draft Basin Plan amendment such that no Phase 2 methylmercury implementation actions would be required in the Delta and Yolo Bypass until the Board has adopted tributary TMDL control programs. This would address many of the Delta dischargers' concerns about fairness. Under this approach, staff would develop the upstream control programs during Phase 1 and have a more comprehensive plan for controlling tributary inputs to the Delta when staff returns to the Board after the Phase 1 methylmercury studies are completed.

Delaying Phase 2 implementation until upstream TMDLs are adopted would provide time for additional collaboration with public agencies and stakeholders to better integrate the Bay Delta Conservation Plan, Delta Vision, California Bay-Delta Program Ecosystem Restoration, the Delta Risk Management Strategy, FloodSAFE California, and other efforts with the implementation of the Delta mercury control program. Implementation of pollution prevention measures for total mercury, Cache Creek Settling Basin improvements, and identification other legacy mercury projects would still take place during Phase 1. Staff recommends that the Basin Plan amendment retain requirements for agencies and dischargers to implement actions to reduce human health risks while methylmercury control actions are evaluated during Phase 1. This will address the human health concern for stakeholders who consume mercury-laden fish from the Delta.

The stakeholder collaboration process that is starting in December 2008 will likely evaluate additional ideas for addressing methylmercury sources in the Delta's tributary watersheds. For example, stakeholders and Board members could consider increasing the geographic scope of the Phase 1 methylmercury characterization and control studies to include additional nonpoint sources in the tributary watersheds.

7. Assign methylmercury allocation and study requirements to the State.

A substantial amount of the inorganic mercury and methylmercury may come from the tributary watersheds downstream of dams due to erosion of streambed and banks contaminated by legacy mining practices. Some stakeholders have suggested that:

- The State should be responsible for some portion of the methylmercury studies and cleanup activities because these rivers are 'waters of the State'; and
- Not assigning responsibility to the State would unfairly oblige urban areas and other local entities to solve a problem caused by the Gold Rush, which had statewide benefits.

During the April 2008 hearing, staff proposed assigning an allocation to the State. Staff needs to research whether this option is viable. If it is, the State government would be responsible for a portion of the methylmercury studies and implementation of legacy mercury and methylmercury controls. Details that will need to be evaluated for this option include:

- Should the State be responsible for addressing legacy mercury, participating in methylmercury studies, meeting a methylmercury allocation, or all of these;
- Which State agency or agencies would be named and what their roles would be; and
- Are legislative actions needed for the State to meet any allocation assigned to it?

8. Do not include the 0.06 ng/l ambient water goal in the Basin Plan amendment.

Some stakeholders and Board members are concerned about how the goal for methylmercury concentration in ambient Delta water could be used by Board staff in the future in regulatory programs that implement the TMDL. The 0.06 ng/l goal for ambient Delta water has several purposes: it is used to link methylmercury in Delta water to methylmercury in fish; it is used to determine how much methylmercury sources need to be reduced to achieve the proposed fish tissue objective; and it is used to determine which methylmercury sources would be required to conduct methylmercury studies. The USEPA requires that there be a linkage between the fish methylmercury objective and methylmercury sources. Dischargers are concerned that the 0.06 ng/l goal will

appear in permits as either an effluent or receiving water limit. Staff does not recommend that 0.06 ng/l be used as an effluent or receiving water limit.

Before the February 2008 staff reports were released, staff revised the draft Basin Plan amendment language to include an explanation of how the goal is used in Phase 1, and how the goal will not be used as an effluent limit in permits during Phase 2 unless the Board makes that determination and amends the Basin Plan. However, based on comments received, the new language did not resolve all concerns on this issue.

As a result, at the April 2008 hearing, staff proposed revisions to the draft Basin Plan amendment to address these concerns. Staff proposed an option to remove the references to the 0.06 ng/l ambient goal in the draft Basin Plan amendment so that Board staff and others do not misinterpret the goal as an effluent or receiving water limit. A description of how the goal was used to develop the Basin Plan allocations and study requirements will remain in the staff reports to justify the study requirements.

Related to the issue of use of the 0.06 ng/l aqueous goal as a permit limit are stakeholder concerns about the form of interim limits (e.g., load-based or concentration-based) that would be in effect during Phase 1 of the TMDL implementation. The intent of including Phase 1 concentration limits in the proposed Basin Plan amendment was to ensure that NDPES facilities would continue to maintain current performance levels and keep methylmercury and inorganic mercury concentrations at existing levels during Phase 1. Staff recommended interim concentration limits rather than load limits to allow facilities to expand their discharges due to population growth. Imposing a load limit, even as an interim (Phase 1) limit, could result in enforcement, penalties and other Board actions including the potential for connection bans if a facility exceeds a predetermined load and cannot reduce either the effluent concentration or discharge volume. A narrative interim limit for methylmercury could also accomplish the aim of maintaining current performance levels at NPDES facilities. Staff presented the narrative interim limit option at the April 2008 hearing and will discuss this as an option at the stakeholder meetings.

In addition, the draft Basin Plan amendment recognizes water conservation programs and reclamation programs, and this can be modified to be consistent with a narrative interim limit.

9. Allow regional monitoring program rather than require all dischargers to conduct individual receiving water monitoring.

Some stakeholders have suggested that mercury monitoring be done collaboratively through a regional monitoring program. Staff agrees that the costs for receiving water monitoring can be expensive and there may be an economy of scale if monitoring

efforts among different dischargers were combined. Stakeholders and Board staff have been discussing a regional monitoring program for multiple water quality constituents. Staff will continue working with stakeholders to develop a coordinated monitoring plan for mercury, possibly through the broader monitoring program that is being considered for the Delta. Instead of entities monitoring their receiving water for methyl and total mercury individually, staff believes that a coordinated approach can be created that would minimize costs as well as meet the needs of the mercury control program for tracking sources.

10. Schedule more frequent Board updates to evaluate Technical Advisory Committee and study progress during Phase 1.

In the draft amendment, staff proposed a schedule for staff to update the Board three times during the eight years of Phase 1. Some stakeholders were concerned that this is too infrequent because the mercury program will be such a big effort that involves many stakeholders. In response, staff suggests increasing the frequency of updates regarding the program's progress, stakeholder involvement, and results from the methylmercury studies. Staff could provide updates annually, either as an information item to the Board or in the Executive Officer's report to the Board. Staff proposes to revise the recommended Basin Plan amendment to increase the reporting frequency.

11. Provide exemptions for "de minimis" and emergency flood control projects.

DWR commented that some of their activities are either time critical or are so small that mercury impacts are not expected and should therefore be exempt from the mercury TMDL. Staff agrees that emergency flood protection projects and projects that are not expected to enhance inorganic mercury or methylmercury discharges should be exempt from some, but not all, of the Delta mercury control program requirements. For instance, if a levee fails, DWR would be exempt from addressing methylmercury discharges due to emergency levee repairs. However, DWR could have measures in place to ensure that the materials used to rebuild the levees do not contain contaminated materials and comply with other existing Basin Plan requirements and Board programs. Also, normal operations such as maintenance dredging or sediment removal from weirs in the Yolo Bypass would be subject to this proposed control program.

Staff is proposing revisions to the draft Basin Plan amendment to allow exemptions for *de minimis* and emergency flood protection projects. Staff proposes that some *de minimis* projects would require prior Board approval before the exemption was granted. Since the April 2008 hearing, DWR and Board staff have met several times to resolve DWR concerns expressed at the hearing. DWR and Central Valley Water Board permitting staff will continue to work together to determine how to define 'de

minimis' projects, whether this is based on project length, area (acres) and/or volumes (cubic yards) of material disturbed during the construction project. In addition, staff will work with DWR to develop a general list of emergency flood protection projects that would be considered exempt without prior Board or Executive Officer approval.

C. Board member and related stakeholder questions and statements during the April 2008 Board meeting *(in order of occurrence)*

12. Is a fish tissue objective based on a 1-meal-a-week consumption rate protective of beneficial uses? How do we address this?

Setting a fish tissue objective is a policy decision that the Board will make. Staff developed four alternatives of fish tissue objectives for the Board to consider and evaluated many scenarios in developing the four alternatives, including alternatives based on USEPA's default consumption rate (about two eight-ounce meals per month), and USEPA's recommended consumption rate for subsistence anglers and their families (about 4.5 eight-ounce meals per week; see the Basin Plan amendment staff report for alternatives and Table 4.5 of the TMDL staff report for consumption scenarios). Staff recommends the alternative that is based on allowing people to safely eat one meal per week of a mix of Delta species (e.g., catfish, bass, bluegill, salmon, and crayfish). Staff recommended a water quality objective that is as protective as possible while having a reasonable assurance of being achieved.

One meal per week (32 g/day of Delta fish) is higher than consumption rates used by the USEPA for its criteria, namely the methylmercury fish tissue criterion (based on 17.5 g/day) and the California Toxics Rule mercury criterion (based on 18.3 g/day). There are people who eat more than one meal per week of Delta fish (see #15 below). A lower fish tissue objective that allows more fish meals per week, however, may not be achievable. Even so, if people eat mainly Delta fish species with low levels of methylmercury, they can safely eat more than one meal per week.

Staff evaluated whether the objective alternatives were likely to be achieved; that is, whether they are scientifically and technically feasible. Staff's recommended objective is nearly met in the Central Delta subarea, which suggests that it can be met elsewhere in the Delta. In addition, a recently published, scientific study of fish mercury levels across the western United States found that there are few water bodies where fish levels are lower than the proposed objective. This study indicates that methylmercury levels in top trophic level fish lower than the recommended objective may not be achievable in western states.

13. Why didn't staff begin with a control program for upstream water bodies? I am concerned that studies have not been done for the American, Feather and other tributaries before we do the Delta TMDL.

There was concern during the April 2008 hearing that control programs should be developed for upstream water bodies before the Delta. A detailed response to this question was provided in the April 2008 Board meeting agenda package, Attachment 3. There are several reasons that staff recommends adopting a Delta TMDL program before the upstream programs:

- Developing a TMDL control program for mercury in the Delta is a high priority because many people regularly eat Delta fish and some Delta communities consume large quantities of Delta fish.
- Determining what reductions need to be made in the tributary inputs to the Delta to achieve safe fish mercury levels in the Delta sets the minimum requirements for upstream watershed control programs.
- As discussed under item #1 of this document, developing and implementing methylmercury control actions in the Delta in conjunction with inorganic mercury control actions in the tributary watersheds will result in more immediate improvements in the local Delta area. In addition, methylmercury control methods developed for the Delta can be applied to upstream sources.
- At the time when the Central Valley Water Board's TMDL priorities were established, more information was available for the Delta than any of its tributary watersheds except Cache Creek and Clear Lake. The USEPA has instructed States "to use the data that are available" to develop TMDL control programs, and has placed great pressure on States to develop the TMDLs as quickly as possible. During Phase 1 of the proposed Delta control program, staff would collect additional information to develop the upstream control programs. Using the CALFED data released in October 2008, staff has already begun to develop methylmercury load estimates for point and nonpoint sources in each of the Delta's tributary watersheds. Staff will be prepared to present the preliminary load estimates in the stakeholder collaboration process. In addition, staff has begun developing a methylmercury TMDL for one tributary, the American River.

Implementing a control program for the Delta is a priority because people from multiple ethnicities, communities, and income levels regularly eat Delta fish for reasons that include need, culture, and enjoyment. A recent University of California, Davis, study estimated that 5% of anglers interviewed in the lower Sacramento River and northern Delta had a mercury intake 10 times higher than recommended as safe by the USEPA and USFDA. About 300,000 licensed anglers fish in the Delta each year, along with an unknown number of unlicensed anglers. According to Dr. Fraser Shilling's testimony during the April 2008 meeting, the California Department of Fish and Game estimates

that there are up to twice as many unlicensed anglers as licensed anglers. Dr. Shilling said that, if we assume 400,000 anglers fish in the Delta, then about 20,000 anglers could have a mercury intake 10 times higher than recommended as safe by the USEPA. Dr. Shilling's estimate highlights the need to make reductions in Delta fish mercury levels as quickly as possible. Staff recognizes that reducing within-Delta sources alone will not eliminate the health risks to Delta fish consumers. Staff believes, though, that developing controls for both within-Delta and upstream methylmercury sources and engaging consumers in risk reduction education and other activities is the quickest way to address the problem while additional TMDL work is begun upstream.

14. How will we measure the effectiveness of the program?

The purpose of the implementation program is to decrease methylmercury concentrations in fish so that the fish tissue objectives are achieved. Ultimately, the effectiveness will be evaluated by measuring methylmercury in Delta fish. The proposed Basin Plan amendment describes what species, when, and where fish should be sampled to compare with the objectives. Water monitoring will be conducted to see if specific management practices are effective at reducing methylmercury discharges. Small fish could be monitored to evaluate projects in the short term. In addition, the program will be considered effective if dischargers are able to develop methylmercury management practices that are technically and economically feasible.

The implementation program will have other performance measures as well. These include review by staff and the Technical Advisory Committee of the Phase 1 methylmercury study plans, results, and time schedules for implementing feasible methylmercury controls. Requirements for monitoring and implementing the methylmercury controls will be enforced through NPDES permits, the Irrigated Lands Waiver Program, and 401 Water Quality Certifications for dredging. Throughout Phases 1 and 2, staff will report to the Board regarding the progress of the program. The human health risk reduction component of the implementation plan could include tests of effectiveness such as tracking the number of consumers who are informed of fish contamination and quantifying mercury exposure in consumers.

15. What's the total number of people who are high fish consumers?

As noted earlier, about 300,000 licensed anglers fish in the Delta each year, along with an unknown number of unlicensed anglers. At the April 2008 hearing, Dr. Fraser Shilling (Department of Environmental Science and Policy, University of California, Davis) noted that CDFG staff estimates that there are up to twice as many unlicensed anglers as licensed anglers. From surveys of anglers and fish consumers in the northern Delta area, Dr. Shilling and colleagues estimated that 5% of fish consumers have a methylmercury intake 10-fold greater than the level that is considered safe by

the USEPA and USFDA. He said that a conservative estimate of high consumers would be 400,000 anglers multiplied by 5%, which is 20,000 anglers. More study is needed to confirm this number.

The Department of Health Services has led several surveys of fish consumption and has talked with shore anglers, boaters, community groups, and low-income women. They found that of people who eat Delta fish, between 7 and 22% eat local fish more than once per week. The most popular types of fish are catfish and bass. These species are at the top of the food chain and thus are relatively high in mercury.

16. When you are talking about methylmercury removal, are you talking about BMPs?

There may be several ways to reduce the amount of mercury available for methylation and to reduce the amount of methylmercury discharged. For instance, there could be activities to address inorganic mercury removal, such as mine cleanups, removing contaminated sediment, and best management practices (BMPs) to prevent the erosion and re-deposition of contaminated sediment. In addition, the SRCSD District Engineer stated during the April 2008 hearing that the SRCSD WWTP's effluent total mercury and methylmercury decreased as a result of influent total mercury decreases associated with the initiation of their "Be Mercury Free" source control program.

Methylmercury controls could include management practices and other actions to reduce methylmercury production and discharge. Management practices for methylmercury could include holding water on a wetland longer before discharge to facilitate photodegradation and sedimentation of methylmercury, rerouting the water from a seasonal wetland to a permanent wetland, or routing water to upland areas for other irrigation uses. In addition, staff's evaluation of WWTP effluent and influent methylmercury concentration data indicates that some treatment processes could be more effective at reducing methylmercury than others. More methylmercury control studies are needed so that dischargers can develop a greater range of management practices and identify the ones that are most effective for their discharge.

17. This TMDL needs a stakeholder process that is larger and more collaborative than what has occurred.

Staff agrees that this policy requires a more involved stakeholder process that goes beyond the traditional Basin Plan amendment process. To respond to Board Members' concerns, staff will hold public stakeholder meetings to discuss the policy questions and develop additional options to address stakeholder concerns. Staff is working with a professional facilitator from the Center for Collaborative Policy (CCP) to plan the

meetings. In addition, CCP will conduct stakeholder interviews to assess current conditions and desired future outcomes for the proposed TMDL.

Also, staff has begun a series of meetings with the Department of Water Resources and committees of the Bay Delta Conservation Plan. Staff continues to coordinate with the California Department of Fish and Game and U.S. Fish and Wildlife Service to work on developing wetland management practices.

Some stakeholders indicated that there has been a lack of meetings with staff in the last year. Staff met with numerous stakeholders and considered their comments when developing staff recommendations for a control program for the Board's consideration. Stakeholder input was gathered during:

- The public review of draft reports released in August 2005, June 2006, and February 2008;
- A public CEQA scoping meeting in September 2005, and two public workshops in September 2006;
- Board workshops in November 2005 and March 2007; and
- More than 30 individual and group stakeholder meetings that included representatives from more than a hundred different stakeholder interests, including but not limited to, local, State, and federal agencies, NPDES dischargers, wetlands, agriculture, water management, environmental justice, mining, and private consultants and laboratories.

During the program development period to date, individual stakeholder interests submitted 36 comment letters. Also, 11 comment letters were submitted by groups that represent about 40 different stakeholders. Staff considered all stakeholder comments when developing staff's recommendations for a control program for the Board to consider. All written comments from stakeholders are available for review by the Board and public.

Staff had extensive stakeholder input leading up to the March 2007 workshop. Since the 2007 workshop, staff met with all stakeholders who directly requested a meeting or had specific questions and concerns. As described in Attachment 2 to the April 2008 Board meeting agenda package, staff made many changes in response to the numerous verbal and comments provided by the stakeholders. However, not every stakeholder comment resulted in a modification to the proposed program if staff did not believe that the suggestion would result in the Board meeting the objectives of the control program. The five policy questions and amendment options presented to the Board at the April 2008 hearing were directly related to concerns expressed by stakeholders. While Board staff developed this TMDL with traditional stakeholder involvement, we did not engage in a "stakeholder process".

Given the complexity of this TMDL and the significant concerns expressed, we have embarked on a facilitated stakeholder process with the help of the Center for Collaborative Policy. This process will allow stakeholders to work with a neutral, independent organization on the issues and come to resolution on the proposed Basin Plan language. As of early November 2008, stakeholders have been invited to the first collaborative stakeholder meeting on 19 December 2008. CCP staff has begun interviewing over 70 stakeholders to develop groundwork for the meeting process.

In addition to policy development, stakeholder collaboration will be important during implementation of Phase 1 for coordination with the Technical Advisory Committee to design effective methylmercury studies, evaluate results, and prioritize methylmercury implementation actions for the Board's consideration at the end of Phase 1.

D. Other stakeholder questions and statements during the Board meeting

18. Staff should have language in the Basin Plan amendment similar to that included in the Cache Creek TMDL amendment, which gives the EO authority to determine adequate mitigation for habitat restoration activities but also include flood control and dredging projects.

Stakeholders suggested that the Basin Plan amendment include language similar to that included in the Cache Creek TMDL amendment, which gives the Executive Officer authority to determine adequate mitigation for habitat restoration activities, but to also include flood control and dredging projects. The Cache Creek mercury control program has Executive Officer exemptions for:

1. Erosion control requirements near bank swallow habitats, and
2. Controlling methylmercury from new reservoirs, ponds, and wetlands when (a) all reasonable management practices to limit methylmercury discharges are being implemented, and (b) the projects are being developed for the primary purpose of enhancing fish and wildlife beneficial uses.

Since the April 2008 hearing, staff has had discussions with the steering committee of the Bay-Delta Conservation Plan in order to identify possible future concerns regarding habitat or endangered species protection and to coordinate the TMDL with the BDCP. Staff will coordinate with the BDCP to address their concerns. Thus far for the Delta, specific projects that would require language that provides exemptions for threatened or endangered wildlife species habitat have not been identified

The Cache Creek program requires implementation of reasonable methylmercury mitigation measures for habitat restoration projects. Similarly, the proposed Delta program requires projects to conduct the methylmercury characterization studies, identify methods to control methylmercury, and implement management practices as feasible. The proposed Delta Basin Plan amendment does not limit creation of wetland projects or require wetland projects to implement management practices now. Flood control and dredging projects would need to evaluate methylmercury production and possible mitigations for changes to current and future flood control operations; however, staff does not recommend that flood control and dredging projects be required to implement control actions during Phase 1. As described above, Board staff is working with DWR to develop a list of *de minimus* projects and criteria for defining projects for which exemptions would be granted. This list would apply to other projects as well.

19. The proposed control program will impact other beneficial uses. No benefit/cost analysis was provided for the proposed control program. The proposed program would cause the cost of public benefit projects to increase, and extend times for projects' completion.

The proposed control program would require wetland restoration projects and other beneficial projects such as flood control, water management, and wastewater treatment, to participate in studies to evaluate methylmercury production and management. During Phase 1, entities are not required to implement methylmercury controls. Staff will work with stakeholders and the Technical Advisory Committee to evaluate possible methylmercury controls for feasibility and the potential for unintended consequences.

It is expected that some methylmercury management practices that are developed in Phase 1 will be feasible and able to be readily implemented. Project proponents should consider making these improvements as wetland restoration and other projects are developed. Staff believes that it is reasonable to implement practices that do not impact habitat function or other benefits if at the same time the management practices would result in less methylmercury entering the Delta ecosystem.

After the methylmercury studies are completed, the Board may decide that certain sources should be exempt from implementing methylmercury controls, such as wetlands created specifically for recovering endangered species if the wetland would lose function from methylmercury management practices. However, studies are needed first to determine a suite of methylmercury management practices, and to find out if and how the methylmercury management practices could affect habitat function. In addition, it is not known how methylmercury production by the wetlands impacts wildlife that eat fish from the wetlands.

The February 2008 Basin Plan amendment draft staff report provides cost estimates for the Phase 1 studies and potential implementation options, but it does not attempt to quantify a dollar amount for the benefits of reducing fish mercury levels. It is very difficult to quantify or place a value on reducing the mercury levels in fish. There are benefits to both people and wildlife if they consume less contaminated fish. The Central Valley Water Board is not legally required to estimate the value of resources as part of the economic considerations. However, because information is available on the value of the Delta fishery and the potential costs of mercury intake by people, such information was summarized in Section 3.2.4 of the draft Basin Plan amendment staff report. However, staff does not have dollar estimates for the benefits of reducing Delta fish mercury levels.

The studies and implementation of management practices will increase the cost and extend the time for completion of some projects. However, each project is not required to conduct individual studies. There will be economy of scale and time if a well-designed, comprehensive study is conducted and produces results that are applicable to multiple wetland restoration projects. In this way, per-project costs and time delays would be minimized.

Concern over methylmercury is not unique to the Delta TMDL. The CalFed Record of Decision and the Ecosystem Restoration Program Plan identified increased production of methylmercury as a potentially significant impact of wetlands development that should be evaluated and mitigated as necessary.

20. The proposed Delta control program is limited by the Basin Plan amendments already in effect for Cache Creek and San Francisco Bay, creates a funding burden to in-Delta interests for an environmental legacy of Statewide concern, and lacks funding to accomplish objectives.

During the April 2008 hearing, stakeholders commented that the proposed Delta control program is limited by the Basin Plan amendments already in effect for Cache Creek and San Francisco Bay. Staff considered the need to comply with and/or be consistent with these two amendments, lessons learned from the development of these two amendments, and Delta-specific needs and constraints when developing the draft Basin Plan amendment for a Delta control program. For instance, the Cache Creek and San Francisco Bay programs established fish tissue objectives that allow a fish consumption rate of one meal per week. Staff recommends the same consumption rate for the Delta objectives. The Board may select a different consumption rate and objective for the Delta (see discussion in item #12). In addition, the Delta control program needs to address the San Francisco Bay program's mercury allocation for the Central Valley. The total mercury load allocation from the San Francisco Bay Regional Board does not hamper the Central Valley Water Board's actions to control total mercury because even

more total mercury likely will need to be removed from Central Valley waterways to correct the Delta's mercury impairment.

Stakeholders stated that the proposed Delta control program creates a financial burden on in-Delta interests for an environmental legacy of statewide concern. However, responsible parties in the Delta would be accountable only for their contribution to the methylmercury impairment. Upstream sources also would be responsible for reducing inorganic mercury and methylmercury loads to the Delta. In response to stakeholders' comments, staff proposed assigning an allocation to the State, including responsibility for a portion of the methylmercury studies and implementation of legacy mercury and methylmercury controls. This option is described under item #7 (page 31).

The Delta mercury program proposed in February 2008 will be expensive. Estimated costs for in-Delta entities during the next 30 years are summarized below. Although high, staff believes that the costs are comparable to expenditures for other major water quality problems in the Delta and other mercury control programs (see tables on the next page). Relative to other TMDLs, the Delta methylmercury program costs more because it addresses a much larger geographic area and more types of sources (point and nonpoint sources of total mercury and methylmercury). For example, the San Francisco Bay TMDL implementation cost considerations addressed only those potential costs for controlling total mercury discharges from point sources (NPDES-permitted wastewater facilities and MS4s). The Clear Lake and Cache Creek TMDLs' cost estimates addressed the remediation of mines and contaminated sediments in the Cache Creek watershed.

In addition, the Delta methylmercury control program is not the first to include requirements for studies to address a water quality impairment. The control program for low dissolved oxygen in the Stockton Deep Water Ship Channel also required that responsible parties conduct studies estimated to cost $15.6 million (Gowdy and Grober, 2005).

Stakeholders noted that there is a lack of funding to accomplish objectives. Staff agrees that some resources earmarked for wetland restoration, water management, and other beneficial projects may need to be used to address methylmercury issues. Individual studies by every existing and future project are not required. Costs to projects could be minimized if comprehensive studies are conducted and results are applied as projects are being designed and constructed. As grant and loan funding becomes available, Board staff will work towards making funding for methylmercury reduction projects a high priority. The focus of priority funding is addressing 303(d)-listed impaired waters, and the Delta has been identified as a high priority impaired water body. The Board supports funding projects that address the water quality

Estimated Costs for Within-Delta Sources		Estimated Annual Cost (averaged over 30 years)	
Delta TMDL Program Component		Low	High
Phase 1 MeHg characterization & control studies for existing sources (cost averaged over 8 years)		$190,000	$660,000
Public outreach & risk reduction activities		$130,000	$130,000
Point & nonpoint source mercury & MeHg monitoring		$180,000	$200,000
Within-Delta NPDES facility & MS4 total mercury minimization measures		$880,000	$1.8 million
Phase 2 MeHg control actions for within-Delta/Yolo Bypass sources		$1.1 million	$9.4 million
Total Annual Cost for Within-Delta Sources [(a)]	Phase 1	$1.4 million/yr	$2.8 million/yr
	Phase 2	$2.3 million/yr	$12 million/yr
Total for Proposed Delta TMDL Program [(a, b)]	**Phase 1**	**$5.9 million/yr**	**$13 million/yr**
	Phase 2	**$7.3 million/yr**	**$22 million/yr**

(a) The Phase 1 annual cost does not include methylmercury control implementation costs. The Phase 2 annual cost does not include Phase 1 study costs.

(b) The total estimated cost for the entire proposed Delta mercury control program includes tributary source analyses and source reduction feasibility studies; total mercury control projects in the Cache Creek Settling Basin and other tributaries (beyond those needed for upstream TMDL, Title 27, or NPDES requirements); monitoring and mercury source minimization requirements for NPDES-permitted discharges in tributaries between the Delta and major dams; methylmercury and total mercury controls in watersheds that discharge to the Delta that are not currently Section 303(d) listed; a regional atmospheric mercury emissions characterization and control study; technical advisory committee costs; and surveillance, monitoring, and reporting costs to evaluate fish and ambient water methylmercury levels' compliance with the proposed fish tissue objectives and tributary allocations. The total study costs shown in Table 4.1 of the Basin Plan amendment draft staff report were divided by 8 to estimate annual study costs. The estimate also includes cost estimates for future methylmercury sources that do not currently exist, such as new wetland restoration projects and new wastewater treatment plants. The Phase 1 cost does not include methylmercury control implementation costs and fish and ambient water surveillance/monitoring costs. The Phase 2 cost does not include study and program development costs. The total estimated cost for the Delta program does not include implementation costs expected to be encompassed by upstream TMDL programs.

Implementation Costs for Other TMDL Programs	Estimated Annual Cost (averaged over 30 years)
Cache Creek Watershed – Methylmercury:	$1.2 million
Clear Lake – Total Mercury:	$1.7 million to $5.5 million
San Francisco Bay – Total Mercury:	$530,000 to $3.5 million
Delta – Diazinon/Chlorpyrifos:	$6.4 million to $14 million
Sacramento & Feather Rivers – Diazinon/Chlorpyrifos:	$300,000 to $7.7 million
Stockton Deep Water Ship Channel – Dissolved Oxygen:	$530,000
San Joaquin River (Lower) – Salt & Boron:	$27 million to $38 million

priorities as described in the Watershed Management Initiative,[7] including projects that assess source loading and implement existing TMDL programs for nonpoint source pollutants in areas of identified beneficial use impacts.

21. The TMDL program should recognize that discharges from the City of Sacramento's Combined Sewer System are episodic and that recent upgrades, which divert more discharge to the SRCSD WWTP, meet the goals of the TMDL and should not require methylmercury studies or control actions for this system.

A City of Sacramento representative stated during the April 2008 hearing that the draft Basin Plan amendment's required monitoring frequency does not recognize the episodic nature of discharges from Sacramento's Combined Sewer System (CSS). Staff agrees and will modify the draft Basin Plan amendment to address this concern.

The City of Sacramento representative also noted that the CSS is being upgraded and will eventually drain about 95% of sewage and summer and winter stormwater flows to the SRCSD WWTP rather than to the Sacramento River. Staff agrees that these upgrades will be beneficial with respect to reducing mercury and methylmercury discharges from urban runoff. That portion of the waste load allocation now assigned to the CSS that in the future will be diverted to the SRCSD WWTP can be incorporated in the SRCSD WWTP allocation when the CSS NPDES permit is updated. Once all upgrades are completed, and less methylmercury flows to the river, the CSS may meet its allocation, thus negating the need for a study. If the City of Sacramento submits a plan and time schedule for the CSS upgrade, either individually or as part of a more comprehensive management plan for Sacramento area NDPES dischargers, the request not to conduct the study could be approved.

22. Sufficient evidence or a statistical analysis that a total mercury TMDL would take centuries has not been provided.

If no control actions of any kind were taken to remediate legacy mercury in the Delta's tributary watersheds, staff estimates that natural processes would take many centuries to completely remove the legacy mercury. Evidence supporting staff's assertion comes from the source analysis of total mercury that continues to enter the Delta years after the mercury and gold mining period and studies of contaminated sediment transport conducted elsewhere. The magnitude of legacy, mine-related mercury spread through river beds and banks downstream of major dams that continues to erode the Delta and difficulties in controlling these loads is discussed under question #1 (page 3). One

[7] Watershed Management Initiative (Revised October 2004): http://www.waterboards.ca.gov/centralvalley/water_issues/watershed_management/r5_wmi_chapter.shtml

example of the magnitude of mercury remaining in tributary creeks years after mining has stopped can be found in Cache Creek. Cache Creek received mercury from mines in the Clear Lake, Harley Gulch, Bear Creek, and Davis Creek watersheds. Although mining began in the 1850s and major operations ceased over sixty years ago, concentrations of mercury in sediment entering the Cache Creek Settling Basin are five to ten times higher than in sediment upstream of the mined areas.[8] Similarly for another heavy metal, in the River Swale in England, more than 70% of contaminated sediment that originated from lead mining remains in the 30-mile reach of river downstream of the mine sites, more than 200 years after closure of the mines.[9]

Improving the sediment and mercury trapping efficiency of the Cache Creek Settling Basin now would result in significant benefits in the Yolo Bypass in the near future (e.g., ~10 years). However, similarly substantial legacy mercury reduction projects have not yet been identified in other tributary watersheds. Staff contracted an environmental engineering consultant to identify and evaluate additional legacy mercury reduction projects in the tributary watersheds below the reservoirs and recently received the final report, which will be made available to the public on the Board website as soon as an electronic copy has been obtained. The Board would review these possible projects when it considers adoption of the upstream mercury TMDL control programs.

More than likely there will need to be numerous small projects (compared to the Cache Creek Settling Basin) located at mercury-contaminated areas both downstream and upstream of the dams. For example, projects could include construction of settling basins on small tributaries, remediation of dredge tailings, and bank stabilization and other remediation actions at mine sites and/or streambeds with contaminated material. Because major dams are very efficient at trapping sediment-bound mercury that is currently discharging from historic mine sites, most of the mercury-contaminated sediment entering the Delta is likely from legacy mercury in stream channels downstream of reservoirs. In addition, although testimony by the Sierra Fund indicated that small reservoirs such as Lake Wildwood may transport methylmercury downstream, recent CalFed mercury study results suggest that the three largest reservoirs – Shasta, Oroville, and Folsom/Nimbus – export very low concentrations of methylmercury. Therefore, efforts would likely need to focus on legacy mercury projects downstream of major dams to effectively reduce inorganic mercury and methylmercury loading to the Delta. Removing mercury from river channels with contaminated sediment (e.g., Feather, Bear, and Yuba Rivers) by constructing settling basins or dredging is expected

[8] Foe, C. and D. Bosworth. 2008. Mercury Inventory in the Cache Creek Canyon. Central Valley Regional Water Quality Control Board staff report, February.
Cooke, J., C. Foe, A. Stanish and P. Morris. 2004. Cache Creek, Bear Creek, and Harley Gulch TMDL for Mercury. Central Valley Regional Water Quality Control Board Staff Report. November.

[9] Coulthart, T. J. and M. G. Macklin. 2003. Modeling long-term contamination in river systems from historical metal mining. *Geology*, 31(5) 451-454.

to be highly expensive and to have substantial potential for negative environmental impacts. It may be necessary in some areas to rely on natural erosion to eventually remove the mercury.

The Delta watershed area downstream of major dams is more than 19,000 square miles, comprising more than 10% of the area of California and about a third of the area of the Central Valley (see Figure 2 on page 5 of this document and Table 2.1 in the Delta TMDL report). A review of historic mine features downstream of major dams indicates that legacy mercury reduction projects likely would be tens to hundreds of miles upstream of the Delta. Although legacy mercury reduction projects are expected to reduce local methylmercury levels in water and fish, it would likely take decades to centuries for the sum of their sediment (inorganic) mercury and water methylmercury reductions to result in measurable decreases in Delta sediment mercury and fish methylmercury concentrations. A substantial portion of legacy mercury in the upstream channels and floodplains may be uncontrollable and will require natural processes to flush it from the system. This natural flushing could take more than a century to completely remove the remaining legacy mercury from the upstream channels.

San Francisco Bay Board staff and scientific reviewers similarly expect that removing mercury from San Francisco Bay is a long process. The largest mercury source identified by the San Francisco Bay mercury TMDL is erosion of mercury-enriched sediment from the floor of Suisun Bay and San Pablo Bay. The mercury-enriched sediment is a legacy of historic mining in the Central Valley and other Bay-area watersheds. Feasible control strategies for the bed erosion were not available at the time the TMDL was developed. San Francisco Bay Water Board staff estimated that, if natural erosion continues at its current rate in Suisun Bay and San Pablo Bay, it would take more than 110 years for mercury-laden sediments to erode completely.

23. This amendment is not likely to achieve its goals because methylmercury (MeHg) is not conservative. Effluent MeHg and/or inorganic mercury may be easily re-methylated or de-methylated downstream. This is a site-specific problem. A WWTP mercury discharge will just get converted back to MeHg in the downstream environment. UC Davis experts say that more MeHg demethylates in clear water than in cloudy water, where MeHg is more stable.

The Delta TMDL is based on empirical data, not on an assumption that methylmercury is always conservative. Staff recognized that the aqueous concentration of methylmercury at any site or time is the result of the interaction of multiple factors, including methylmercury production and degradation. Board staff and others have found that in some waterways, processes of methylmercury production and transport downstream in the water column are dominant and in others, processes that remove

methylmercury from the water column are dominant. Clearly, methylmercury is not always acting in a conservative fashion.

In the Sacramento River, methylmercury appears to be relatively conservative. Concentrations of methylmercury increase with distance downstream in the Sacramento River. The sums of methylmercury loads in the Sacramento River at Colusa and loads from the major tributaries (Colusa Basin Drain, Feather River, and American River) closely match the loads in the Sacramento River downstream at Freeport.

Conversely, in the Central Delta, net methylmercury concentrations appear driven by methylmercury removal from the water column. Concentrations of methylmercury are lower in the Central Delta, relative to the periphery and in tributaries. The removal of methylmercury from the water column is due to a combination of processes, primarily breakdown of methylmercury by light (photodegradation) and attachment to particles and settling. Breakdown of methylmercury by bacteria, and uptake into biota also likely contribute to methylmercury loss in the Delta. The Central Delta subarea is not considered impaired due to methylmercury.

The proposed Basin Plan amendment divides the Delta into subareas based on the hydrologic characteristics and mixing of source waters. By using existing methylmercury concentrations and water movement patterns when determining methylmercury allocations for the eight Delta subareas, staff has taken into account the different factors affecting methylmercury. A network of methylmercury measurements on the major tributaries as they entered the Delta and at locations within the Delta show how average methylmercury concentrations change as water moves across the system. The allocations for methylmercury sources in each subarea are based on conditions observed in each subarea from actual in-stream measurements and so incorporate non-conservative changes in methylmercury concentrations. Available data indicate that reducing loads of methylmercury to any subarea will result in lower concentrations of methylmercury in water and biota in that area. For example, as discussed earlier in #5d, SRCSD concluded that its WWTP effluent contributes about the same percentage of methylmercury to Sacramento River biota downstream of its discharge as it does to the methylmercury loading in the river. There is no information that suggests that methylmercury discharged into a water body would disappear so rapidly that none of it would be accumulated, at least in part, into the food chain immediately downstream of the discharge.

Mercury is a regional problem because fish methylmercury levels throughout the Delta, the Yolo Bypass, and many of the tributary waterways are higher than is considered safe for human and wildlife consumption. This is because inorganic mercury and methylmercury sources are present throughout much of the region. However, fixing the problem will take local, waterway-specific solutions because each waterway has its own

unique set of methylmercury and inorganic mercury sources. As noted earlier, staff developed a separate methylmercury allocation scheme for each hydrologic subarea of the Delta because the levels of impairment within, and the methylmercury sources that discharge to, each subarea are different.

24. There should be an independent stakeholder group that works with the TAC to design the studies, like that formed for development of sediment quality objectives.

Stakeholders commented that there should be an independent stakeholder group that works with the Technical Advisory Committee (TAC) to design the studies, as was done for the sediment quality objective development. Staff agrees that this can an effective way of developing coordinated study plans involving various discharger categories forming stakeholder groups, e.g., WWTPs, wetlands, and water management. In meetings with stakeholders, Board staff will explore ways to organize and conduct a methylmercury study development group comprised of stakeholders. Staff could represent the Board as one stakeholder at the table. The TAC could provide expert opinion to the methylmercury study group regarding study design and interpretation of study results.

E. Stakeholder comments made prior to the release of the February 2008 staff reports that staff did not use in their recommendations and rationale for why the comments were not included

25. Proposed fish tissue objectives do not allow people to eat enough Delta fish.

After the March 2007 Board workshop, staff evaluated a lower objective that would allow people to eat about four meals per week of Delta fish. This consumption rate corresponds to a fish tissue concentration of 0.05 mg/kg methylmercury. Staff does not recommend changing the proposed fish tissue objective due to a recent study that indicates a lower objective cannot be achieved in the western United States due to global and naturally occurring mercury (see discussion in #12). Therefore, establishing a fish tissue objective below the proposed objective for the Delta may not be achievable.

26. There should be individual allocations for individual managed wetlands and agricultural lands, not group allocations organized by subwatershed.

Staff does not propose that all individual landowners meet individual allocations because currently there is not sufficient information to assign allocations to individual

agricultural and wetland discharges. The Central Valley Water Board's Irrigated Lands Program allows landowners to participate in coalitions to meet requirements for monitoring and pollution control. Staff expects that the methylmercury studies will show that some types of agricultural areas and wetlands have high methylmercury production while others have little-to-no production, and that some types of methylmercury sources can be more effectively controlled than others. It is possible, then, that Delta subarea allocations may be met with only some dischargers implementing controls. The Board may consider individual allocations later in the control program if group-based reductions are not effective.

27. Expand the Basin Plan Amendment section on reducing people's mercury exposure from eating Delta fish to include risk reduction, not just risk communication.

Letters from several stakeholder groups representing fish consumer and environmental justice requested that staff strengthen the Basin Plan amendment language on human health risk management and add the following language to requirements for a risk management program:

> "Coordination with affected communities to develop and implement exposure management programs that meet their particular needs, possibly including providing access to fish with less mercury or other protein sources and supporting or funding programs which address community health problems exacerbated by consumption of mercury in fish".

The draft amendment requires that major dischargers work with affected communities and public health agencies to develop and implement a risk management program to reduce mercury exposure to people who eat Delta fish. The draft also requires that the program include activities "…that reduce the actual and potential exposure of and mitigate health effects to people and communities most likely to be affected by mercury in Delta fish." This language is consistent with State Water Board requirements. The language is broad enough to encompass activities for reducing mercury exposure that go beyond public outreach and education. To ensure a broad interpretation, the proposed Basin Plan amendment section is titled "Risk Management", instead of "Public Outreach". Staff does not believe that adding detailed language, such as providing access to other fish or protein, to the Basin Plan amendment is necessary.

If an affected community determines that providing access to other protein sources is needed to enable their subsistence fishers to reduce their mercury exposure, the current draft Basin Plan amendment language would allow this activity. Board staff recommends, though, that such an activity be guided by local and/or State agencies and other entities with expertise in nutrition education and supplementation.

At the April 2008 hearing, Dr. Fraser Shilling presented each Board member with a report titled, “Community-Based Strategies to Reduce Mercury Exposure in Delta Fishing Communities”, prepared with funds from the Central Valley Water Board. This strategy makes it clear that affected communities want to be involved in the planning and implementation of programs to evaluate or reduce mercury exposure. The strategy does not detail the types of risk management programs that each affected community or ethnic group believe would work best for them. Affected communities should be given opportunities to identify effective risk management activities when the Delta TMDL’s risk management program begins, after adoption of the Basin Plan amendment. Fish consumers and environmental justice advocates also should be involved in stakeholder meetings that will be held to develop options for the Delta control program (see Comment #17, page 37).